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LA RONGE GREENSTONE BELT
ENVIRONMENTAL DATA REVIEW

PREPARED FOR:

THE TOWN OF LA RONGE
LA RONGE, SASKATCHEWAN

March, 1987

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INTRODUCTION

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1.0 INTRODUCTION

1.1 Background and Study Objective

The La Ronge Greenstone Belt, an area located between the Town of La Ronge and the Village of Southend, has recently received considerable attention related to mineral exploration, particularly for gold. Several commercially viable gold discoveries have heightened interest and exploration in the area, including the development of a gold mine and mill near Star Lake, and a proposed mine and mill near Mallard Lake.

Associated with the development of any new mine and mill in the province, is the requirement for the proponent to obtain approvals under provincial legislation and regulations. Depending on the potential environmental implications of such a development, this could require the preparation of an Environmental Impact Assessment (EIA). Such an assessment involves the collection and analysis of pertinent data and the submission of an Environmental Impact Statement (EIS) by the proponent. Because many of the gold prospects occur in somewhat restricted areas, potentially in adjoining leases, data requirements for an EIA may be similar or even identical.

The purpose of this study is to minimize costs and duplication of effort by proponents in collecting available environmental baseline data for project feasibility analysis, general impact assessment and monitoring purposes. The object of the study is to prepare a fully referenced, systematic inventory of baseline environmental data, available from published and unpublished sources, required for the environmental impact assessment process. A secondary objective of this report is to familiarize proponents and the public with potential environmental sensitivities associated with all phases of gold mining (ie. exploration, mining, milling and abandonment) in the La Ronge Greenstone Belt.

It should be noted that, while the information presented will be of general use, there would be a need to collect site specific data for any major development project.

This study was jointly funded by Saskatchewan Department of Environment and Public Safety and the Saskatchewan Northern Affairs Secretariat and Canada Department of Regional Industrial Expansion through the Northern Economic Development Subsidiary Agreement.

1.2 Study team

The Town of La Ronge retained Terrestrial & Aquatic Environmental Managers Ltd. (TAEM). TAEM was assisted by Clifton Associates Ltd., Westplan Research Associates, Prairie Environmental Services Inc. and Stanley G. Saylor Heritage Resource Consultant.

1.3 Study Area

The La Ronge Greenstone Belt is located between 55° and 56° 30' north latitude and between 103° and 106° west longitude. The area encloses a portion of the Churchill River Basin, Lac la Ronge, and the most southerly tip of Reindeer Lake. The study area is shown on Figure C-1. It is located between the Town of La Ronge and the Village of Southend Saskatchewan. The boundaries of the study area, although well-defined, were extended in some instances to account for naturally defined areas (ie. drainage basins).

1.4 Scope of Work

This study consisted entirely of a review of existing information from published and unpublished sources. The criteria for inclusion of data was its applicability and usefulness to the EIA process. Interpretation of the data assimilated was not a requirement of this study program. Subject areas included in this review, as detailed by Saskatchewan Environment, follow.

1. Meteorology and Air Quality
- meteorological data from the nearest stations - temperature, precipitation, wind, etc.
- evaporation data
- rainfall chemistry information
- available information on background levels of pertinent air quality parameters

2. Surficial Geology
- information on land forms, soils, stratigraphy, etc.
- identification of known aggregate sources
- identification of sensitive terrain

3. Hydrogeology
- available information related to the hydraulic and hydrogeochemical characteristics of major stratigraphic units
- identification of groundwater users (locations, amounts, types of use, etc.)

4. Surface Hydrology
- identification of existing streams, lakes and drainage basins
- stream flow and lake level data - flushing rates
- bathymetric information

- identification of surface water users (locations, amounts, types of use, etc.)

5. Water Quality
- available surface water and sediment quality data
- groundwater quality information

6. Aquatic Resources
- species lists and population information (plankton, benthic macroinvertebrates, fish, macrophytes)
- rare and/or endangered species
- identification of known critical habitats and sensitive time periods
- fish catch statistics (sport, domestic, commercial)

7. Vegetation
- species lists
- community structure and composition data
- rare and/or endangered species
- forestry

8. Wildlife
- species lists and population information (furbearers, ungulates, raptors, colonial nesting species, waterfowl)
- rare and/or endangered species
- identification of known critical habitats and sensitive time periods
- identification of and harvest statistics for Game Management Zones and Fur Blocks

9. Heritage Resources
- inventory of known heritage resource sites

10. Land Use

- mining: mineral dispositions, active exploration sites, active and abandoned mines
- forestry: present and proposed harvesting areas
- trapping: trap lines, usage, economic value
- commercial fishing: locations, quotas, usage, economic value
- transportation: roads, trails, air strips, navigable waters
- transmission lines: existing and proposed
- recreation: outfitter camps, recreational surface leases, parks and campsites (existing and proposed), canoe routes
- designated areas: IBP sites, game sanctuaries, etc.
- Indian reserves: existing and proposed

11. Community Environment

- locations of towns, villages, hamlets, seasonal camps, etc.
- demographic data: population, age, sex, employment, etc.
- community infrastructure: educational, social and health facilities; services - sewer, water, transportation, fire protection, police, etc.
- economic activity: businesses, forestry, mining, trapping, fishing, guiding, etc.

1.5 Report Format

As a compendium of available data, this report is organized in Sections defined by subject material. Each Section has been designed to 'stand on its own' in order that retrieval of information is facilitated. Each Section is fully referenced, and includes all tables and figures compiled relating to the subject matter. Where possible, suitable information is presented as large scale maps of the study area

(1:250,000 scale). These maps are found in the map pocket at the back of the report.

As one objective of this report is to familiarize proponents and the public with environmental sensitivities associated with gold mining in the La Ronge Greenstone Belt, this report reviews the phases of gold mining in an environmental context. In addition, specific sensitivities of various components of the environment (such as fisheries, wildlife, etc.) are briefly addressed throughout this document.

2.0 METHODS

The preparation of this report required the collection and synthesis of biophysical, atmospheric, socio-economic and heritage resource data relevant to the La Ronge Greenstone Belt. This included a review of available published and unpublished information sources. A large portion of the data was made available from government files. Additional sources included university and government libraries, discussion with knowledgeable individuals and available mining sector reports. Information sources are detailed within each section of this report.

It should be noted that only available data could be presented in this report. The lack of recorded data in certain areas does not necessarily indicate an absence of the subject of interest in the area. As an example, known Bald Eagle nest sites have been mapped, but other nest sites would be expected to occur.

SECTION B
ENVIRONMENTAL SENSITIVITY

1.0 INTRODUCTION

This section presents the environmental sensitivities, in graphical format, of the various phases of mining. These phases include:

1. Pre-development and early exploration (Figure B-1).
   In this phase, the environment is found in its natural unaltered state. Disturbance is generally very limited from such activities as geodetic surveys, prospecting and others.

2. Intensive exploration (Figure B-2).
   This phase can result in some impacts to the environment. Potential impacts are associated with localized exploration activities such as line clearing, drilling and decline development. These activities can result in disturbance and possible loss or alteration of important habitat for the wildlife and aquatic resources. Other potential impacts are associated with the establishment of an exploration camp including garbage disposal, sewage, fire hazards, and other.

3. Ore extraction and milling (Figure B-3).

   This phase holds the greatest potential for impact to the environment. Impacts to vegetation, wildlife and the aquatic resources can occur that are long-term in duration and regional in area. Other impacts may also be realized to heritage resources and the socio-economic characteristics of the area. With proper design and consideration, many impacts can be reduced to an acceptable short-term and local level.

4. Decommissioning (Figure B-4).

   The decommissioning phase represents activities associated with the restoration of the development area to a natural setting. This would include such activities as reclamation and containment of the tailings facility, removal of permanent structures, portal closure, re-vegetation, and others.

5. Abandonment (Figure B-5).

   This is the final phase of the development where, following decommissioning activities, the area is left to natural processes to return to a 'pre-development' state.

The province has environmental protection guidelines for road developments, temporary work camps and other developments available from the Saskatchewan Department of the Environment and Public Safety.

Figure B-1. Predevelopment and Early Exploration.

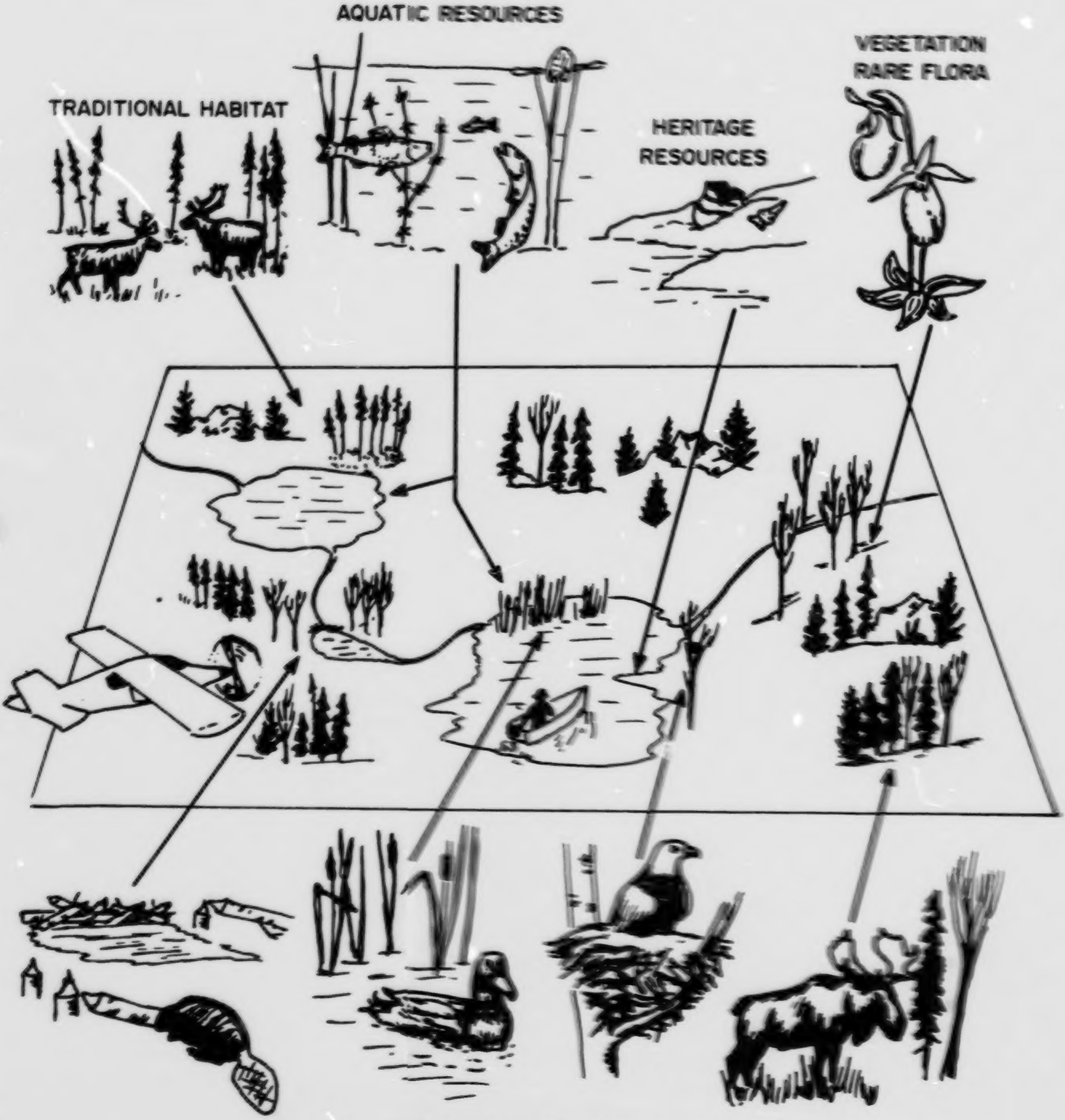

AQUATIC RESOURCES
VEGETATION
RARE FLORA
TRADITIONAL HABITAT
HERITAGE
RESOURCES
WILDLIFE RESOURCES

Figure B-2. Intensive Exploration

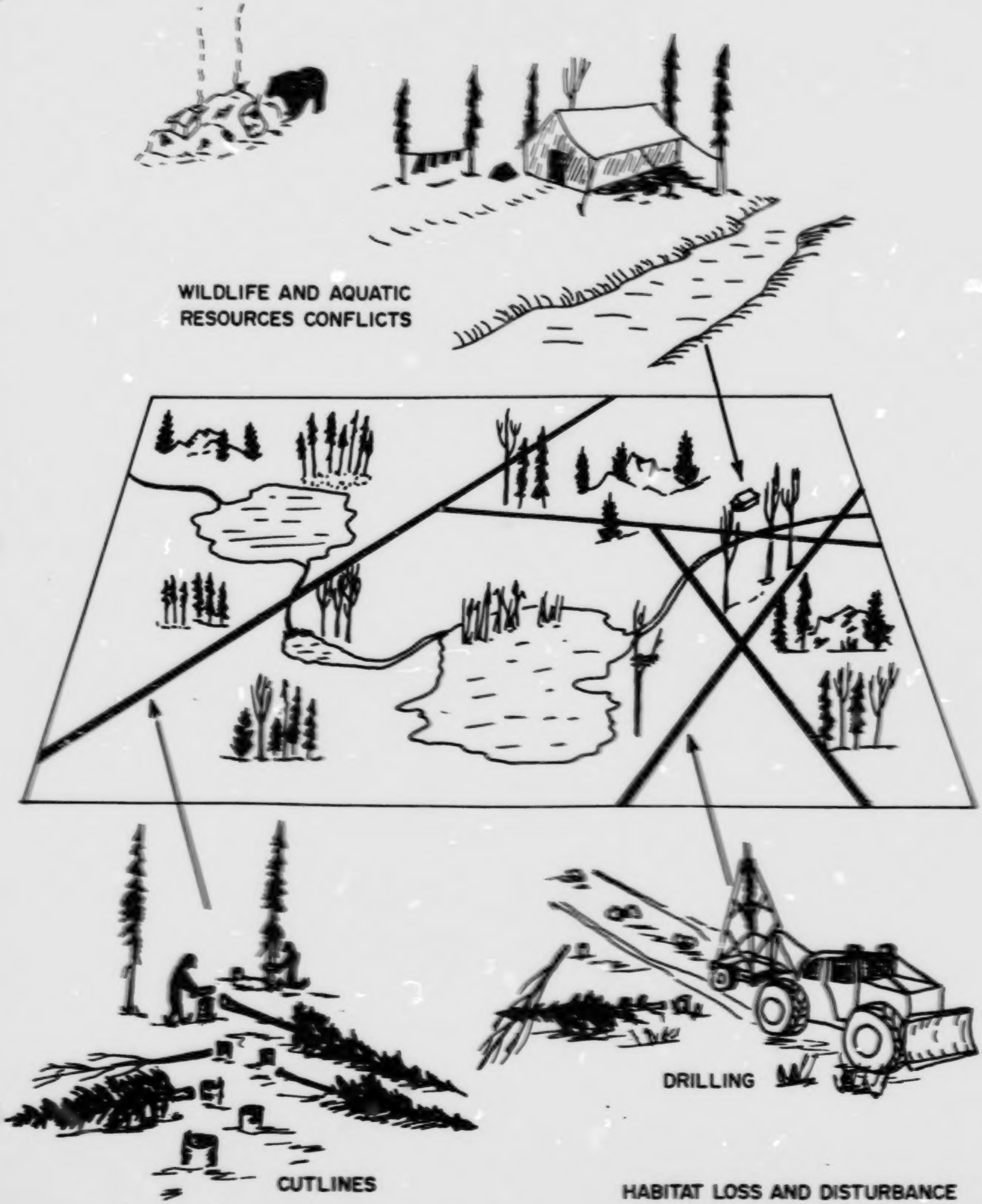

WILDLIFE AND AQUATIC RESOURCES CONFLICTS
DRILLING
CUTLINES
HABITAT LOSS AND DISTURBANCE

Figure B-3. Ore Extraction and Milling.

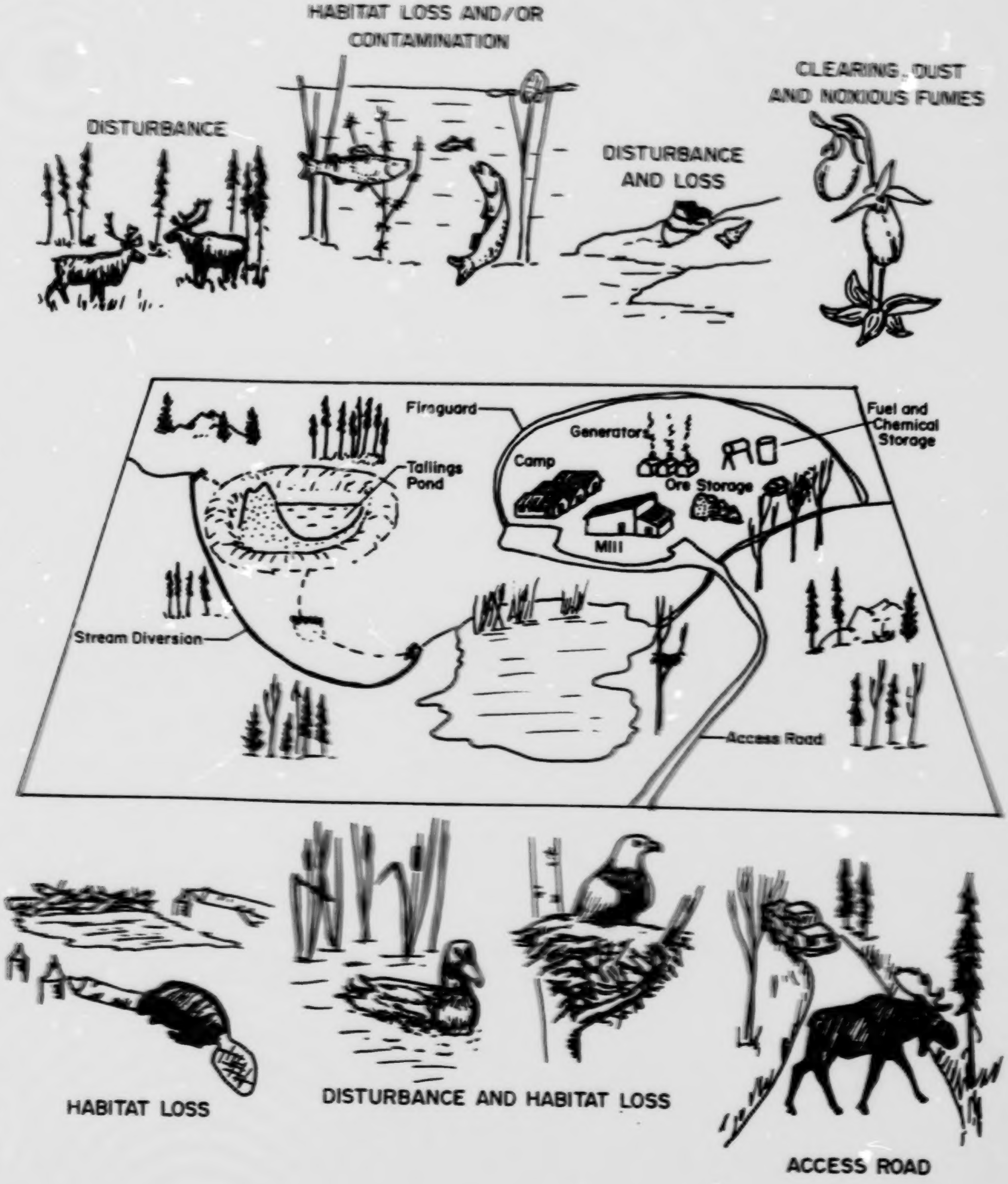

HABITAT LOSS AND/OR CONTAMINATION
DISTURBANCE
CLEARING, DUST AND NOXIOUS FUMES
DISTURBANCE AND LOSS
Fireguard
Fuel and Chemical Storage
Generators
Tailings Pond
Camp
Ore Storage
Mill
Stream Diversion
Access Road
HABITAT LOSS
DISTURBANCE AND HABITAT LOSS
ACCESS ROAD

Figure B-4. Decommissioning

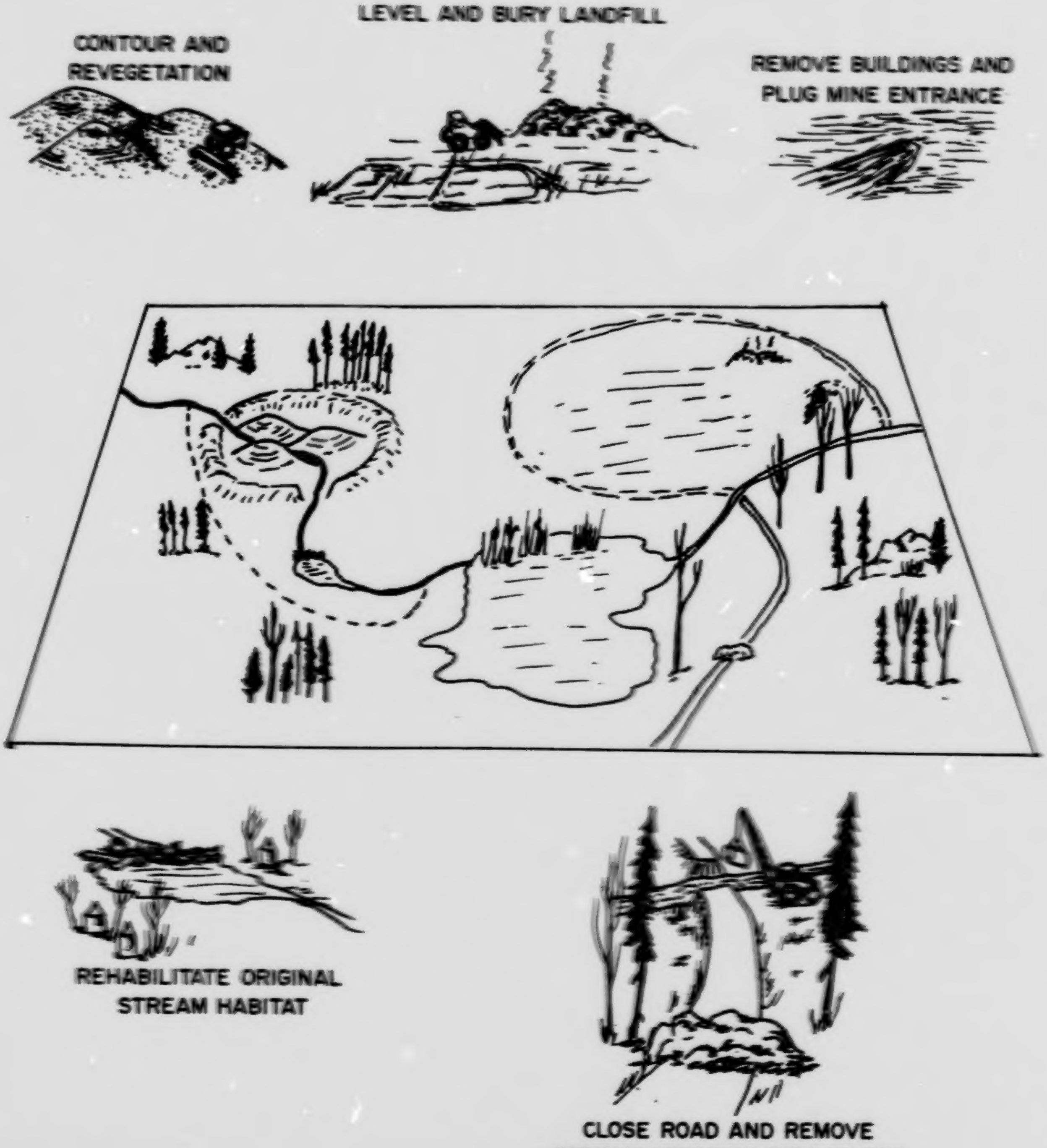
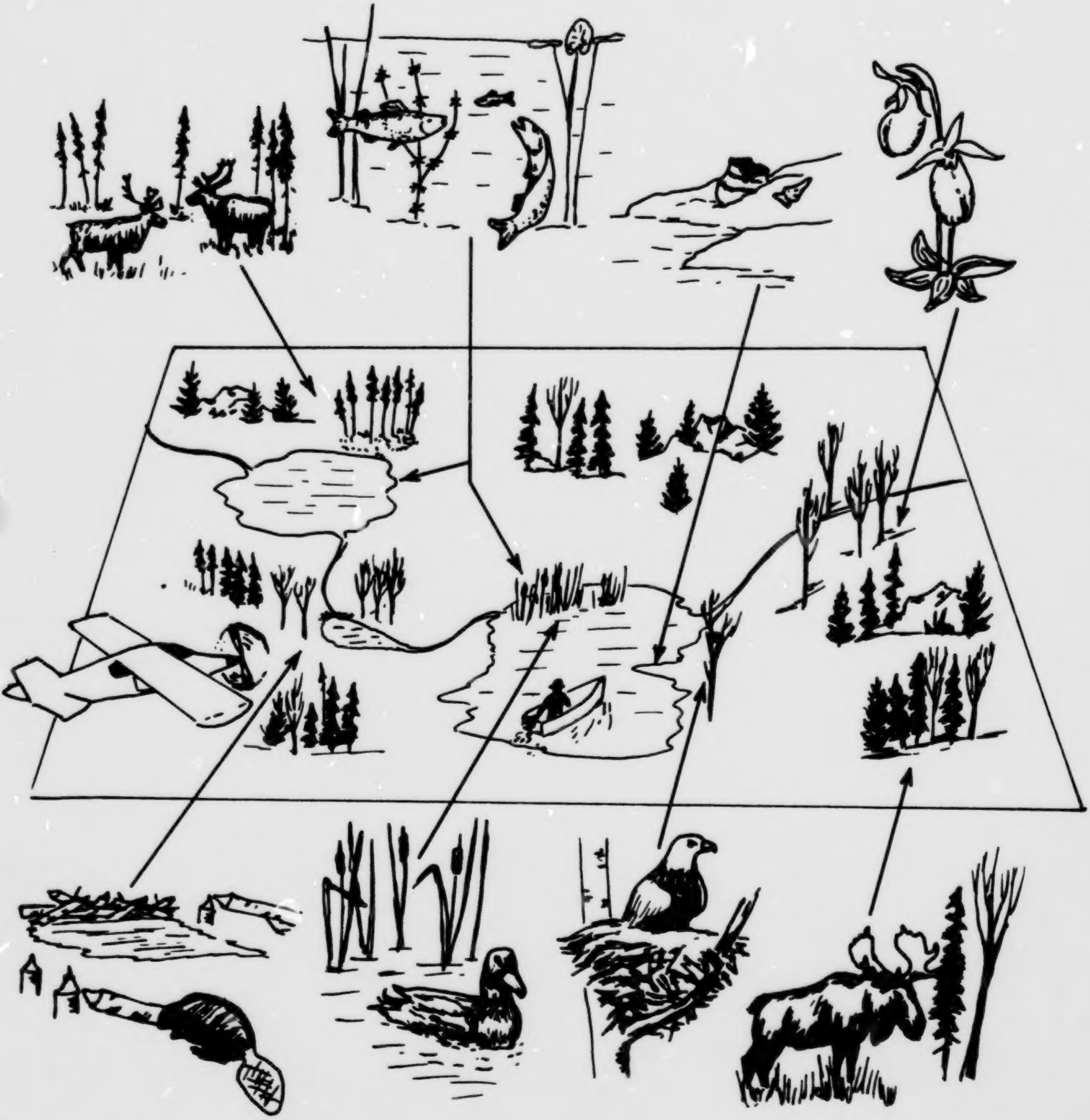

CONTOUR AND REVEGETATION
LEVEL AND BURY LANDFILL
REMOVE BUILDINGS AND PLUG MINE ENTRANCE
REHABILITATE ORIGINAL STREAM HABITAT
CLOSE ROAD AND REMOVE STREAM CROSSING STRUCTURES

Figure B-5. Abandonment.



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1.0 INTRODUCTION

This section of the report describes the climate of the area and presents general information regarding the air quality, geomorphology, stratigraphy and hydrogeology.

The climate of the area has been described utilizing data from climate stations within the study area. Data reported includes mean maximum and minimum daily temperatures, the estimated mean monthly precipitation and variation, the median snow cover, freezing and thawing indices, potential evapotranspiration and mean wind speed and prevailing direction. A summary of annual normal data includes the number of days with frost, days with snowfall, days with rain, the mean annual rainfall and snowfall, the total annual precipitation, the numbers of days with precipitation, the greatest rainfall in 24 hours and the probable maximum precipitation as rainfall in a 24 hour period.

Only a limited amount of air quality data are available for the study area. Some data are available from the Cree Lake climate station and the Star Lake project (SMDC 1985a & b). Data collected include the deposition rates of sulfur as sulfate and nitrogen as nitrate, pH measured in precipitation and the results of dust fall and sulfation monitoring. Reference is also included to snow pack monitoring as a method of studying air pollution deposition.

The description of the geomorphology of the area includes a description of the prominent glacial, proglacial and postglacial landforms present in the study area. The identification of the landforms present at any particular site is a useful first step in the determination of material types present.

The description of the stratigraphy of the study area includes information regarding the geochemistry of lake sediments, and material characteristics of major soil types.

The hydrogeology of the study area is described in general terms with some data describing hydrostratigraphic units included. Groundwater users and groundwater quality is characterized with available data.

The La Ronge Greenstone Belt is located between 55° and 56° 30' north latitude and between 103° and 106° west longitude. The area encloses a portion of the Churchill River Basin, Lac la Ronge, and the most southerly tip of Reindeer Lake. The study area is shown on Figure C-1.

2.0 CLIMATE

The climate for the La Ronge Greenstone Belt is represented by stations located within the study area and other nearby stations. The stations are shown on Figure C-1. Those within the study area include La Ronge, Whitesand Dam and Brabant Lake. Stations near the study area are Island Falls, Collins Bay and Cree Lake.

Tables C-1 to C-6 are summaries of meteorological data for the climate stations. Figures C-2 to C-41 illustrate the mean, maximum and minimum daily monthly temperature; the estimated mean monthly precipitation and variation; the median snow cover; freezing and thawing indices; potential evapotranspiration and mean wind speed and prevailing direction. The potential evapotranspiration has been calculated using the Thornthwaite method. The Thornthwaite method of calculation utilizes the temperature and the length of day. A crop factor is not used, and the estimate of evapotranspiration does not provide accurate estimations of evapotranspiration for short periods of time; no allowance is made in the method of calculation for variations in wind and relative humidity (Gray 1970). Table C-7 is a summary of annual normal data including the number of days with frost, days with snowfall, days with rain, the mean annual rainfall, the mean annual snowfall, the total annual precipitation, the number of days with precipitation, the greatest rainfall in 24 hours, and the probable maximum precipitation as rainfall in a 24 hour period.

In general, the mean monthly temperature in the study area ranges from approximately -23°C in January to 17°C in July at La Ronge, and -26 °C to 14°C at Collins Bay. The potential evapotranspiration is estimated to be approximately 414 mm at Collins Bay to 492 mm per year at La Ronge.

The mean annual precipitation in the La Ronge Greenstone Belt is estimated to be 414 mm to 530 mm, with between 12 mm and 46 mm of precipitation occurring on a monthly basis during the colder months of October to April, mainly as snow. During the months May to September, between 26 mm and 90 mm of precipitation per month occurs, mainly as rain.

The median date of first snow cover (25 mm or more) is approximately 31 October. At least 25 mm of snow persists for approximately 160 days, with the median date of the last snow cover (25 mm or more) being approximately 20 April. The median depth of maximum snow covers is approximately 50 cm.

A statistical estimate of the probable maximum precipitation (PMP) has been made using a technique described in Hogg and Carr (1985) and based on an empirical relationship described by Hershfield (1977) which is a function of duration and the mean annual extreme rainfall. Hogg and Carr (1985) state that the method produces a "quickly and easily derived, close approximation of the PMP for a station." However, they also indicate that these statistical estimates of the PMP are generally somewhat lower than the estimates based on rational techniques described by Pugsley (1981). For the study area, the PMP varies from approximately 255 mm in a 24 hour period in Collins Bay to 355 mm in Cree Lake. A summary of the estimates are found in Table C-7.

3.0 AIR QUALITY

Only a limited amount of air quality data is available for the study area. Some data are available from Atmospheric Environment Services from their Canadian Network for Sampling Precipitation (CANSAP). Measurements have been made at the Cree Lake climate station to determine the wet and dry deposition rates of sulfur as sulfate and nitrogen as nitrate and pH. Based on these measurements, The wet deposition rates of sulfur as sulfate and nitrogen as nitrate in 1978 were 1.8 and 0.5 kg/ha/yr, respectively (Liaw and Atton, 1981). The pH of the rainfall at this station in 1978 varied from 4.8 to 5.8. Liaw and Atton (1981) report that the wet deposition rates of sulfate and nitrate measured can still be considered at or near global background values. The rain shows some acidification at present; the pH of clean rain is 5.6.

Air quality information from the Star Lake Project (Clifton Assoc. 1986) and is shown on Table C-8. Test results are shown for dust fall monitoring and sulfation monitoring.

Studies have been conducted to determine the chemistry of snow packs in the north to "assess the impacts of natural and anthropogenic acid deposition" (Shewchuk 1983). Impurities become attached to snow crystals in the atmosphere during crystallization and as the crystals move through the atmosphere during wet deposition (Shewchuk 1983). Dry atmospheric fallout and other sources of contamination add to the impurities. Snow packs also collect atmospheric aerosols and particulates, acting as a filter. "When all mechanisms are combined it turns out that a stable snowpack is an excellent collector of atmospheric aerosol particles and gases" (Shewchuk 1983). Pollutants contained in the snow accumulate and are released during the short snow melt in the spring. Because a large portion of the annual precipitation in the north falls as snow, studying snow packs is a natural method to study air pollution deposition (Shewchuk 1983). Snow was collected during a field program in March 1983 from the surface of small lakes (less than one square kilometer in area) in a network of 27 sites. In the Shield region of Saskatchewan, the sulfate concentration measured varied between 0.53 and 0.89 mg/L; the nitrogen as nitrate varied between 0.08 and 0.18 mg/L; the conductivity between 4.8 to 8.0 umhos/cm; and the mean pH from 4.77 to 5.46. Comparison to measurements made in a study in the vicinity of Flin Flon show increases in sulfate, nitrate, conductivity and pH compared to the larger regional study, with sulfate ranging from 0.05 to 2.2 mg/L; nitrogen as nitrate from 0.18 to 0.28 mg/L; conductivity from 8 to 22 umho/cm; and pH from 4.98 to 7.85.

The concentrations of metals in the melt water (calcium, zinc, copper, mercury and arsenic) are uniformly distributed across the study area, except for local anomalies in the Flin Flon area for some of the metals. Zinc and copper were significantly above background levels, with a maximum value of 2.8 mg/L for zinc and 1.47 mg/L for copper. Background levels for zinc and copper were 0.006 mg/L and 0.004 mg/L, respectively.

4.0 GEOLOGY

4.1 Geomorphology

A description of the land forms found in the La Ronge Greenstone Belt study area is found in Schreiner (1983, 1984 and 1986), Campbell (1986a,b & c), Johnston (1978), and Langford (1975, 1977). The general distribution of land forms are shown at a scale of 1:1,000,000 on Map C for the study area. This map was provided by the Saskatchewan Research Council.

In the La Ronge Greenstone Belt study area, areas of thin till and bedrock outcrop are inter-dispersed with large areas of glaciolacustrine material (Schreiner, 1986). Physiographically, the study area lies within the Kazan Region, composed of the Kazan Upland in Saskatchewan (Schreiner 1986) which is developed on the crystalline basement rocks of the Precambrian Shield. Extensive areas of rock form broad, smooth uplands and lowlands. The surface is uneven with up to 90 m of relief; however, the relief is generally in the order of 60 m. Lakes, swamps and muskeg fill the valleys and depressions between the ridges, hills and knolls (Schreiner 1986).

Relief in the area is the result of folding, faulting and fracturing of the rock. Differential erosion of the variable bedrock lithology is responsible for other ridges and valleys. Also, glacial ice has scoured low lying areas, while it smoothed and polished the faces and crests of more resistant bedrock knobs and hills (Schreiner 1986). Overburden has filled some of the depressions in the area. In other areas, a thin mantle of drift covers the bedrock.

The predominant glacial landform in the study area is thin ground moraine (Schreiner 1986) which generally occurs as a veneer over the basement rock, although it increases in thickness within bedrock depressions. It is composed primarily of sandy ablation till or silty sand basal meltout till (Campbell 1986a & b). The ground moraine is dissected by bedrock outcrops, lakes and muskegs and fluvial deposits such as eskers and outwash deposits. Within the study area, glaciolacustrine silts and clays often covers the bedrock or the thin ground moraine.

Other glacial land forms present include eskers, kames, kettles, ice walled channels and buried valleys. The Cree Lake Moraine is the most prominent and significant end moraine in the area (Schreiner 1984). A moraine is defined as a ridge-like accumulation of drift material that has been constructed along the margin of an active glacier (Schreiner 1984). The Cree Lake Moraine crosses the northern edge of the study area approximately 20 km south of Waddy Lake and extends in segments across the study area. It is associated with other regional features such as sandy outwash plains.

Near Brabant Lake, the Cree Lake Moraine appears as a low relief, nearly continuous ridge running to the west approximately 10 m in height and approximately 25 km in length. It curves toward the south and becomes an esker-kame complex, terminating in a broad outwash plateau pitted with large kettles (Schreiner 1984). The moraine is absent from this point to Jewett Lake. It reappears between Jewett Lake and Nagle Lake to the west. Here, it is a nearly straight, single, narrow ridge of high relief rising as much as 35 m above the surrounding terrain as it crosses low lying areas. At the ends of this section near Nagle Lake and Jewett Lake, the moraine terminates in outwash deposits. From this point, the moraine continues to the northwest out of the study area.

Other moraines identified within the study area include a series of end moraines at the south end of Reindeer Lake and south and west of Deep

Bay described by Johnston (1978). These end moraines are less than 2.4 km in length and range in height from 15 m to 60 m. They are composed of mainly sand and gravel which is sorted and bedded in places.

Near McIntosh Lake, located northwest of Missinipe, an end moraine extends to the northwest for a distance of approximately 25 km. The central portion of the end moraine is approximately 25 m above local lake elevations. At the one site sampled by Schreiner (1984), sandy till was encountered on the surface of the moraine.

Eskers, defined as a sinuous ridge of sand and gravel deposited by ice-contact streams, are not commonly found in the study area (Schreiner, 1986). Where present, they tend to conform to bedrock structure and most are parallel to the flow direction of the last ice movement and perpendicular to end moraines. Johnston (1978) describes a "giant esker" between Deep Bay, Reindeer Lake and Marchand Lake which attains widths of over one kilometer and heights of over 60 m. It surface contains kettles, depressions formed as a result of the melting of buried ice blocks, over 30 m deep.

Ice-walled channels are meltwater channels formed in stagnant ice and open to the sky (Schreiner 1984). Drift in the valley may consist of till or sand and gravel. They are pitted with kettles. Large quantities of ice-contact stratified drift in a belt along Highway 102 between La Ronge and McLennan Lake are thought to have been deposited by meltwater flowing through an ice-walled channel (Schreiner 1984). A similar feature is described north and south of Pelican Narrows. Schreiner (1984) notes that many eskers are flanked on either side by a broad band of outwash deposit consisting of sand and gravel, indicating a relationship between the development of eskers and the creation of ice-walled channels.

Buried valleys are similar to ice-walled channels, except that they are associated with preglacial valleys formed in bedrock. A large buried valley system extends north-northeast from the Whitesand Dam to the south shore of Deep Bay and then continues northeast for 10 km, paralleling the east shore of Reindeer Lake. It reappears on the west side of Reindeer Lake and continues northward for a distance of approximately 25 km to Perry Lake. The surface of this feature is characterized by the "giant esker" described previously. Seismic work has revealed that the deposits in the buried valley-esker system exceed 60 m in thickness (Schreiner et al. 1976). An exposure of the valley fill at Whitesand dam shows more than 30 m of well to poorly stratified sediments in a nearly vertical face.

Drumlins are streamline forms composed of glacial deposits and aligned parallel to the direction of glacial flow. Flutings are streamlined, linear grooves separated by low ridges also parallel to the direction of glacial flow. They are generally associated with areas of thicker moraine and are not common in the study area. Some flutings have been noted by Schreiner (1984) near Brule Lake (NTS 74A-12).

Kettles and kames are generally associated with eskers, outwash and other ice disintegration features. Kames are uncommon in northern Saskatchewan (Schreiner 1984), but the few which have been observed are very large. They are commonly composed of sand and gravel and were formed by ice-contact streams flowing in, on or under the ice (Schreiner 1984). Kames and kettles have been identified west of Nagle Lake on the north side of the Cree Lake Moraine, and south of Jewett Lake in the gap in the Cree Lake Moraine. A kame complex around Deception Lake is up to one square kilometer in area and is pitted with large, deep, irregularly shaped kettles in the thick drift in excess of 30 m deep.

Proglacial features in the study area include glacial lakes, meltwater channels, spillways and outwash plains. The main proglacial influence in the study area was Lake Agassiz which covered a large portion of the map area (Schreiner 1984). The extent and development of the lake and associated features such as beaches and strandlines are discussed in detail by Langford (1975, 1977), Johnston (1978) and Schreiner (1983, 1984). The area covered by the lake basin is generally outlined by the extent of lacustrine silts and clays as shown on Map C-1. The sediments of Glacial Lake Agassiz partially mask the bedrock and lower drift deposits. These deposits generally range in thickness from less than 1 m on bedrock uplands, to more than 10 m in bedrock depressions (Campbell 1986a & b). The lacustrine sequence is generally sandy at the base, becoming silty and then more clay rich toward the surface. Locally, the silts or clays are covered by a clay rich till or more commonly, be peat deposits.

Meltwater channels correspond in general to the locations of present day rivers. In the study area, the Foster and Paull Rivers functioned as meltwater channels. These rivers do not have wide sand plains associated with them as do other meltwater channels, since their channels are confined to narrow bedrock valleys (Schreiner 1984). The Reindeer River connecting Reindeer Lake to the Churchill River did not carry much meltwater. A short southeasterly trending outwash channel connects Steephill Lake to the Reindeer River.

A spillway is a channel through which a glacial lake drained. Meltwater channels acted as temporary spillways during de-glaciation. Other major spillways were not identified in the study area.

Outwash plains are composed of sand or sand and gravel. Finer grained outwash is restricted to meltwater channels. A broad outwash plain lying southwest of La Ronge is composed of medium to fine grained sand.

Coarse to fine grained sand and gravel occur sporadically along Highways 2 and 102 from La Ronge to approximately 50 km north of Missinipe (Schreiner 1984). In general, glaciofluvial deposits such as these make up only a very small portion of the study area. Langford (1975) reports that in the Churchill River Study Area, deposits of sand and gravel are rare with fine grained sand occurring in beds within the clay. In the Waddy Lake area studied by Campbell (1986a), it is estimated that less than five percent of the area is covered by glaciofluvial sand and gravel.

Postglacial land forms include muskegs and permafrost. Muskegs are common in northern Saskatchewan and are extensive in the study area (Schreiner 1984). In areas of thin drift over basement rocks, wetlands occur in a perched position occupying depressions in the bedrock. In periods of high runoff, the perched muskegs overflow and activate intermittent streams in the bedrock valleys. Campbell (1986a) reports that most of the small lakes and major creeks and rivers in the Waddy Lake area are bordered by wetlands with muskeg occurring sporadically throughout the area.

The map area lies within the zone of discontinuous permafrost. Its distribution is related to certain aspects of topography, drainage, soils, vegetation and other terrain factors (Brown 1965). Palsen, peat mounds with ice cores, were recognized in the area from the air and were noted by Campbell (1986a) in the Waddy Lake area. Permafrost was encountered in lake sediments north of the Churchill River and east of the Reindeer River in the Pelican Narrows area (Sopuck et al. 1977).

4.2 Stratigraphy

Stratigraphy in the study area consists of Quaternary deposits underlain by Precambrian bedrock. The crystalline bedrocks comprise variously metamorphosed granitoids, metavolcanics and other supracrustal rocks (Schreiner 1986). A pronounced northerly to northeasterly structural trend in some parts of the area coincides with a strong topographic macro-fabric.

Data on the Quaternary stratigraphy are found in Shawinigan (1973) and reported by Langford (1975), Schreiner (1984) and Campbell (1986a & b). Stratigraphic columns are shown on the 1:250,000 map areas (Maps C-2 to C-5) for auger holes reported by Schreiner (1984). The stratigraphic sections reveal information about the sequence of events and the types of processes that occurred in the area. The existence of intertill deposits indicates that glacial deposition of till was followed by fluvial deposition of gravel and sand as the ice melted. These sediments were then covered by glacial till as a result of a re-advance. In general, the upper till is consistently thin and ranges in texture from sandy to silty to clay-rich, a matrix that seems to correspond to the underlying sediments in most places, but is separated from them by a distinct contact (Schreiner 1984). Clay-rich tills in the area around Lake Agassiz are likely related to ice re-advances in the area.

In the Lake Agassiz basin, lacustrine sediments have been deposited in a 'fining upward' sequence, suggesting a retreating ice mass that supplied sediment to the lake basin (Schreiner 1984). Modern lake sediments were deposited in the deeper basins. Peat accumulated in shallow depressions as muskeg.

The glacial stratigraphy is described in areas near Stanley Mission, Otter Rapids, Missinipe, Jaysmith Lake and Rabbit Creek.

A geological investigation of the Quaternary deposits in the Stanley Mission area was conducted by E.A. Christiansen Consulting Ltd. in 1977. The description here is found in Schreiner (1984). Two tills were encountered in test trenches. The tills were overlain by lacustrine silt and clay. The two units were deposited during separate glaciations. The lower, harder till is composed of grey unoxidized and grayish-brown oxidized sandy till. The upper till is softer and is composed of grey unoxidized and olive-brown oxidized sandy and boulder till. Both tills are devoid of expandable clay minerals.

At Otter Rapids, a number of exposures that revealed multiple till sections were found north and south of Otter Rapids (Schreiner 1984). In general, two till units were encountered, a lower hard, fractured, jointed, silty sand till overlain by a clay-rich cobble till. As in the case of the stratigraphy described for Stanley Mission, a period of weathering separated the glaciations responsible for the two till units (Schreiner 1984).

Near Missinipe, an exposure in a gravel pit on Highway 2 shows a thick section of stratified gravel and sand grading upward into silt (Schreiner 1984). Approximately 1 m of till overlies this material. The lower part is rich in silt and clay and contains large boulders, while the upper part is more sandy and loosely packed. Fluvial gravel, sand and silt were deposited during a period of retreat. An ice re-advance then covered these sediments with till.

Near Jaysmith Lake, a 5 m deep auger hole revealed the following sequence from bottom to top: 0.4 m of sandy till, 3.3 m of lacustrine sediments which grade upward from clayey silt through silty clay to clay, and 1.0 m of silty, clayey till containing more than 50 percent clay (Schreiner 1984). The high silt and clay content in the till and the presence of montmorillonite and some carbonaceous material suggest that the till has incorporated some of the underlying lacustrine deposits (Schreiner 1984). This till, and a similar clay rich till found elsewhere throughout the Lake Agassiz basin indicates that the ice re-advanced into the basin after the lacustrine sediments were deposited.

Two auger holes drilled at Rabbit Creek approximately 25 km south of La Ronge on Highway 2 gives further evidence of ice re-advance over Lake Agassiz sediments. From bottom to top, there is more than 20 m of dark grey, hard silt containing layers of till less than 1 m thick; nearly 7 m of brown sandy silt till; 2 m of calcareous, soft, brown silt; about 1 m of soft, brown, oxidized, silty till; and slightly less than 3 m of clay grading upward into silt and fine sand (Schreiner 1984). The overlying till is evidence of ice re-advance over the lower silt, which incorporated some silt into the till. Clay, silt and fine grained sand overlying the till were deposited by Lake Agassiz after ice had receded from the area.

The majority of the proglacial stratigraphic features in the La Ronge Greenstone Belt study area are associated with Glacial Lake Agassiz. A common occurrence in Lake Agassiz deposits is a 'fining upward' sequence of sediments, with coarse grained sediments at the bottom becoming gradually finer grained near the top. The fining upward sequence is related to the depositional history of Lake Agassiz sediments and retreat of the glacier. In general, till is deposited on bedrock and overlain by coarse gravel which grades upward to sand, silt and clay. This sequence has been observed in exposures and auger holes near Brabant Lake and south of Missinipe (Schreiner 1983, 1984). Occasionally near the southern edge of Lake Agassiz where glacial and extra-glacial rivers flowed into the lake, sediments exhibit a 'coarsening upward' sequence (Schreiner 1983).

Fluvial sand and gravel are other proglacial sediments associated with eskers, kames, kettles, crevasse fillings, outwash plains and ice-walled channels (Schreiner 1986).

Modern lacustrine silt and clay deposits occur in some parts of the study area in the Lake Agassiz basin and commonly overlie glaciolacustrine sediments (Schreiner 1984). Peat generally 1 m to 2 m in thickness is found in the study area.

Postglacial sediments such as colluvium and lacustrine silt and clay occur in the study area. Colluvial deposits are distinguished from lacustrine deposits by gravel and pebbles within the sediment. Lacustrine silt and clay deposited in lakes during recent times are found with organic material.

4.3 Geochemistry

Geochemical studies have been conducted to evaluate the possibility of utilizing drift prospecting for gold exploration (Campbell 1986c, Sopuck et al. 1986). Samples collected were analyzed for a variety of major, minor and trace elements. Sopuck et al. (1986) examined forty samples from the Star Lake and Tower Lake areas. Campbell (1986a & c) examined till samples from the Waddy Lake study area.

Hornbrook and Garret (1976) conducted a regional lake sediment survey in the Precambrian Shield area of Saskatchewan. The study sampled bottom sediments at a density of one sample per 13 km^2 over a 51,800 km^2 area. Samples were analyzed for zinc, copper, lead, nickel, cobalt, gold, manganese, uranium, arsenic, molybdenum, iron and mercury. The study delineated "several element trends or regional zones of increased metal content correlative with features of economic interest" (Hornbrook and Garret 1976). Table C-9 is a summary of metal concentrations from the study.

Analysis of lake sediments was undertaken by Sawchyn (1975) for six Reindeer River and four Churchill River Lakes. As part of an environmental impact statement, Clifton Ass. (1986) conducted some lake sediment studies. The results of these analyses are illustrated on Table C-10.

4.4 Material Characteristics

The physical characteristics of the materials found within the La Ronge Greenstone Belt study area has been collected from Shawinigan (1973), Langford (1977) Schreiner (1984, 1986), and Campbell (1986a & c). Testing of materials included determination of grain size and grain size distribution, Atterberg Limits and some limited testing on the shear strength and compressibility of soils. Summaries of material properties is found on Tables C-11 and C-12.

Till

Glacial sediments have been divided into two different units on the basis of stratigraphic location as described previously. They have also been divided by Schreiner (1984, 1986) and Campbell (1986a) into two till units and subdivided again on the basis of texture into sandy till, silty till and clayey till. Although the clay size fraction of the clayey till is not predominant, the clay fraction is much greater than in other till types. Typical grain size distributions of the various types of till are shown on Table C-11 and C-12.

Stratigraphic correlation of drift units is difficult because of the rugged terrain which does not allow a continuous cover of till and the variation in lithology over short distances of the parent Precambrian basement rocks (Schreiner 1986). Correlations can be made over short distances, however. Other parameters that may be used to correlate stratigraphic units are color changes and heavy mineral assemblages (Schreiner 1986).

In the Waddy Lake study area, Campbell (1986a) classifies the lower till as a silty-sandy till. In general, where encountered, the thickness of the lower till is less than 1 m to 8 m, but is commonly less than 4 m thick. It contains from 47 percent to 77 percent of sand sizes and less than 13 percent clay sizes (Table C-12).

Sandy till is the most common glacial sediment in the area. This till is derived from basement rocks and from existing glacial deposits. Sandy till derived from basement rocks contains an abundance of large, angular, igneous and metamorphic boulders which commonly dominate the deposit. The brown upper part of the till is oxidized. The deeper part of the till is grey in color and unoxidized. The depth to which oxidation has affected the till will vary, but in places exceeds 5 m (Schreiner 1986). Sand size particles range from 50 to 90 percent, with less than 10 percent of the till being made up by clay sizes.

Campbell (1986a & c) describes the upper till as a thin and discontinuous unit ranging in thickness from 0.4 m to 3 m. Although the evidence is not conclusive, Campbell (1986a & c) states that the single till sampled at other sites may be this upper till.

Silt, the dominant component of the silty till, makes up as much as 65 percent of the matrix. Clay normally makes up less than 10 percent of the matrix. Silty till is scattered throughout the map area, but is most common in areas underlain by volcanic rocks (Schreiner 1986). It is generally brown at the surface and grey at depth, but the color is darker than that of the sandy till.

Clayey till described by Schreiner (1986) occurs primarily in the southeastern portion of the study area. It is most commonly brown in color and contains pebble and cobbles. The high proportion of silt and clay results in a soil with a higher density than that of the sandy or silty till. The dominant clay minerals are chlorite, kaolinite, illite and a minor amount of sodium montmorillonite. The high clay content of the till and the presence of montmorillonite suggests that the till was derived, at least in part, from the lacustrine sediments of the Lake Agassiz basin.

Sand and Gravel

Sand and gravel are the primary constituents of glaciofluvial land forms such as eskers, kames, kettles, outwash plains and ice-walled channels. Grain size distributions are shown on Table C-11. Campbell (1986a & c) encountered fluviolacustrine sand and gravel beneath lacustrine sediments to depths ranging from 5 m to more than 20 m. Thin, patchy veneers of mainly poorly sorted, silty to gravelly sand of fluvial origin were also encountered over some broad areas. These are likely the result of ablation and fluvial process during de-glaciation and is commonly less than 0.5 m in thickness.

Silt and Clay

Fine grained sediments of glaciolacustrine origin are found in the southeastern area of the study area and are associated with Glacial Lake Agassiz. Many low depressions in this part of the study area may contain more than 10 m of sediments. The grain size distribution for these soils are shown on Tables C-11 and C-12. Engineering properties evaluated by Shawinigan (1973) are tabulated on Table C-13. These include moisture content, Atterberg limits, specific gravity, unconfined compressive strength and compressive index.

Peat

Observations by Schreiner (1984) indicate that the thickness of peat under roads constructed in some parts of the area has been reduced by two thirds. No other data is available.

4.5 Hydrogeology and Hydrogeochemistry

The groundwater levels in the surficial sediments and upper bedrock in the Shield area generally reflect the surface topography, with the drift and upper fractured bedrock generally acting as a single hydrostratigraphic unit. High ground areas would act as recharge zones with groundwater levels well below surface, while in depressions and other low lying areas, groundwater levels would be close to surface. Discharge is to lakes, streams and peat bogs at lower elevations. On the basis of work conducted for the Star Lake Project (Clifton Assoc. 1986), three hydrostratigraphic units are described on a regional basis; overburden deposits including drift and muskeg, fractured bedrock near the surface, and fresh and less weathered bedrock at depth. Regional structures strongly influence the groundwater flow systems (Clifton Assoc. 1986).

The permeability of drift and bedrock was determined by packer tests and rising head tests. A summary of field permeability test results for the Star Lake Project is shown on Table C-14. In a highly fractured, porous dyke zone, a value of 7 X 10-5 m/s was measured. The coefficients of permeability for all remaining bedrock were less than 1 X 10-7 m/s.

For the same project, laboratory testing of peat under low stresses showed that the material had a permeability of 2 X 10-8 m/s or less and a porosity of more than 0.9.

Groundwater Users

The Saskatchewan Water Corporation has catalogued a single groundwater user at Brabant Lake. The water source is listed as glacial and water is used for the municipal supply. No water quality, depth to aquifer or rates of withdrawal are catalogued.

Groundwater Quality

The results of groundwater quality testing for the Star Lake Project is presented on Table C-15. The analyses indicate a high quality, slightly alkaline groundwater, consistent with flow in volcanics with calcite joint fillings (Clifton Assoc. 1986). It is expected that mineral constituents and pH are variable and dependent upon a number of local variables, including composition of surficial materials and bedrock, and drainage.

5.0 BIBLIOGRAPHY

Brown, R.J.E. 1965. Permafrost investigations in Saskatchewan and Manitoba. NRC Canada, Div. of Building Research, Tech. Paper 193.

Campbell, J.E. 1986a. Quaternary geology of the Waddy Lake area applied to prospecting for gold. Saskatchewan Research Council Report R-842-1-E-86.

Campbell, J.E. 1986b. Quaternary geology of the Sulphide-Hebden Lakes area (part of NTS 73P-7) sheets 1 and 2.

Campbell, J.E. 1986c. Quaternary geology of the Sulphide-Hebden Lakes area applied to prospecting for gold; in Summary of Investigations 1986, Saskatchewan Geological Survey; Saskatchewan Energy and Mines, Miscellaneous Report 86-4.

Clifton Associates Ltd. 1986. Investigation and conceptual design, Blindman Lake waste management scheme. Prepared for: Saskatchewan Mining Development Corporation.

Gray, Donald M. (Editor). 1970. Handbook on the Principles of Hydrology. Water Information Center, Inc.

Hershfield, D.M. 1977. Some tools for hydrometeorologists. 2nd Conf. Hydromet., Am. Met. Soc., Boston, Masc.

Hogg, W.D. and D.A. Carr. 1985. Rainfall Frequency Atlas For Canada. Canadian Climate Program, Supply and Service Canada, En56-67/1985.

Hornbrook, E.H.W. and R.G. Garrett. 1976. Regional geochemical lake sediment survey, east-central Saskatchewan. Geological Survey of Canada, Paper 75-41.

Johnston, W.G.Q. 1978. Lake Agassiz's northernmost arm and other features of the quaternary geology in the region around the southern part of Reindeer Lake, northern Saskatchewan. Musk-Ox, University of Saskatchewan.

Langford, F.F. 1975. Geology, Churchill River Study (Missinipe Probe). Churchill River Study, Saskatoon, Final Report 17, 131 p.

Langford, F.F. 1977. Northern extent of Lake Agassiz in eastern Saskatchewan. Canadian Journal of Earth Sciences, 14: 1286-1291.

Liaw, W. K. and Atton, F. M. 1981. Sensitivity to acid of fishing waters in northern Saskatchewan. SPRR, Fisheries Branch, Report 81-1.

Potter, J.G. 1966. Snow cover. Climatological studies Number 3, Cat. No. EN57-7/3, Supply and Services Canada.

Pugsley, W. I. 1981. Flood hydrology guide for Canada: hydrometeorological design techniques. Atmospheric Environment Service, CLI 3-81.

Saskatchewan Mining Development Corporation. 1985a. Star Lake Gold Mine Environmental Impact Assessment. SMDC-Starrex Mining Corp. Ltd.

_______ 1985 b. Star Lake Gold Mine Environmental Impact Statement. Volume 3, Appendix K. SMDC- Starrex Mining Corporation Ltd.

Sawchyn, W.W. 1975. Impact on the Reindeer River and Four Churchill River lakes. Final Report 9, Churchill River Study (Missonipe Probe).

Schreiner, B.T. 1983. Lake Agassiz in Saskatchewan. Glacial Lake Agassiz. Geological Association of Canada Special Paper 26.

Schreiner, B.T. 1984. Quaternary Geology of the Precambrian Shield, Saskatchewan. Saskatchewan Energy and Mines. Report 221.

Schreiner, B.T. 1986. Quaternary geology as a guide to mineral exploration in the southeastern shield, Saskatchewan. Saskatchewan Research Council Technical Report No. 189, Saskatchewan Energy and Mines Open File Report No. 86-5.

Schreiner, B.T., D.W. Alley and E.A. Christiansen. 1976. Quaternary geology: 64D, 64E, 730, 74C, 74B, 74H areas. In: Summary of Investigations 1976, Saskatchewan Geological Survey. Saskatchewan Depatment of Mineral Resources, p 58-62.

Schreiner, B.T., D.W. Alley and S.J. McNamara. 1984 Quaternary geology of the Precambrian Shield, Saskatchewan. Saskatchewan Energy and Mines, Open file report 84-2 to 84-21, (series of 1:250,000 maps with marginal notes - 4 map areas for this study).

Shawinigan Engineering Co. Ltd. 1973. Wintego development, feasibility study, technical report. Unpublished report for Saskatchewan Power Corporation.

Shewchuk, S. R. 1983. A snowpack and surface water chemistry survey of small lakes in northern Saskatchewan. SRC Technical Report No. 155.

Sopuck, V.T., D.A.W. Lehto and D.W. Alley. 1977. Uranium dispersion studies, Maguire Lake area. Summary of investigations 1977. Sask. Geol. Survey, Sask. Mineral Resources.

Sopuck, V.J., B.T. Scheiner and S.A. Averill. 1986. Drift prospecting for gold in Saskatchewan. A paper presented to the Canadian Institute of Mining and Metallurgy Symposium - Gold in the Western Shield. Saskatoon.

Water Survey of Canada. 1985. Historical Stream Flow Summary, Saskatchewan to 1984. Inland Waters Directorate, Water Resources Branch. Ottawa, Canada.

6.0 DATA SOURCES AND CONTACTS

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APPENDIX C-1. TABLES

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Table C-1

Meteorological Summary for Brabant Lake

STATION BRABANT LAKE
PERIOD 1951-1980

LATITUDE 56 00 N
LONGITUDE 103 43 W
ELEVATION est 361 m

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	ANNUAL
MEAN DAILY MAXIMUM TEMPERATURE	-19.7	-12.6	-5.6	5.0	13.7	19.8	22.7	20.7	12.7	6.1	-5.9	-15.5	3.5
MEAN DAILY MINIMUM TEMPERATURE	-31.5	-28.0	-21.7	-9.9	0.0	6.4	9.6	8.1	3.1	-2.6	-13.8	-24.9	-8.8
MEAN DAILY TEMPERATURE	-25.6	-20.3	-13.7	-2.4	6.9	13.1	16.1	14.4	7.9	1.8	-9.9	-20.2	-2.7
STANDARD DEVIATION, DAILY TEMP.	3.5	2.3	4.1	3.1	2.3	2.6	1.1	1.4	3.4	1.7	3.3	4.2	0.6
EXTREME MAXIMUM TEMPERATURE	6.7	10.6	13.9	18.9	28.3	31.7	30.0	32.2	33.3	19.4	11.1	8.3	33.3
EXTREME MINIMUM TEMPERATURE	-49.4	-50.6	-46.7	-36.1	-15.0	-3.9	1.1	-0.6	-12.8	-18.9	-38.9	-47.8	-50.6
MEAN RAINFALL	0.2	0.0	0.1	8.9	31.3	59.2	84.1	67.8	53.9	22.9	0.3	0.0	328.7
MEAN SNOWFALL	31.9	25.2	20.8	28.9	13.2	1.6	0.0	0.0	4.7	21.4	40.6	44.7	233.0
MEAN TOTAL PRECIPITATION	25.4	19.8	17.6	28.8	36.3	64.0	84.1	67.8	59.5	45.9	36.4	44.5	530.1
STANDARD DEVIATION, TOTAL PRECIPITATION	7.9	10.6	4.1	10.1	17.6	21.4	35.9	38.9	46.4	32.1	22.8	12.0	49.2
MEAN WIND SPEED													
PREVAILING DIRECTION													
MEDIAN DEPTH OF SNOW COVER cm	40.6	50.8	40.6	5.1	0.0	0.0	0.0	0.0	0.0	0.0	20.3	30.5	

Note: All temperatures in °C, rainfall and precipitation are in mm, snowfall is in cm, and wind speed in km/hr.

Table C-2

Meteorological Summary for Collins Bay

STATION COLLINS BAY
PERIOD 1951-1980

LATITUDE 58 11 N
LONGITUDE 103 41 W
ELEVATION 490 m

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	ANNUAL
MEAN DAILY MAXIMUM TEMPERATURE	-22.5	-16.5	-10.3	1.7	9.7	16.3	19.4	17.8	10.1	2.8	-8.8	-18.3	0.1
MEAN DAILY MINIMUM TEMPERATURE	-30.2	-25.5	-21.4	-9.3	-1.6	4.8	9.0	7.9	2.5	-4.1	-15.8	-25.4	-9.1
MEAN DAILY TEMPERATURE	-26.2	-21.1	-15.7	-3.9	4.1	10.5	14.1	12.8	6.1	-0.9	-12.5	-22.1	-4.6
STANDARD DEVIATION, DAILY TEMP.	2.8	4.3	4.0	3.4	2.4	1.1	1.5	2.4	2.6	2.3	1.7	4.3	1.0
EXTREME MAXIMUM TEMPERATURE	3.3	4.4	10.6	27.2	26.5	28.3	31.3	27.8	22.2	19.9	11.5	1.7	31.3
EXTREME MINIMUM TEMPERATURE	-43.8	-42.5	-38.4	-30.9	-16.8	-3.9	1.4	-1.1	-9.7	-20.6	-35.0	-43.8	-48.9
MEAN RAINFALL	0.2	0.1	0.0	3.8	31.9	53.2	85.9	66.1	55.5	11.2	0.5	0.0	308.4
MEAN SNOWFALL	19.6	21.7	27.7	32.8	7.2	4.3	0.0	1.0	8.7	30.2	54.8	38.0	348.6
MEAN TOTAL PRECIPITATION	16.9	17.6	22.9	29.3	46.1	56.4	85.9	66.8	68.2	37.9	43.7	30.9	522.6
STANDARD DEVIATION, TOTAL PRECIPITATION	7.0	9.1	9.1	16.1	33.1	29.9	31.3	21.7	28.8	30.4	12.5	9.0	92.6
MEAN WIND SPEED	12.1	12.8	13.2	14.8	14.0	12.7	13.2	13.3	13.2	13.9	13.1	12.4	13.2
PREVAILING DIRECTION	W	S	S	S	E	E	W	W	S	S	S	W	S
MEDIAN DEPTH OF SNOW COVER cm	40.6	50.8	40.6	20.3	0.0	0.0	0.0	0.0	0.0	5.1	20.3	30.5	

Note: All temperatures in °C, rainfall and precipitation are in mm, snowfall is in cm, and wind speed in km/hr.

Table C-3

Meteorological Summary for Cree Lake

STATION CREE LAKE
PERIOD 1951-1980

LATITUDE 57 21 N
LONGITUDE 107 08 W
ELEVATION 497 m

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	ANNUAL
MEAN DAILY MAXIMUM TEMPERATURE	-19.8	-13.1	-6.5	4.2	12.3	18.6	21	19.3	11.9	5.3	-6.3	-15.4	2.6
MEAN DAILY MINIMUM TEMPERATURE	-30.2	-26.1	-21.3	-8.1	-0.4	6.5	9.6	8.9	3.5	-2.2	-14.1	-24.7	-8.2
MEAN DAILY TEMPERATURE	-25.1	-19.7	-13.6	-1.8	6.1	12.9	15.6	14.4	7.9	1.6	-10.4	-20.1	-2.7
STANDARD DEVIATION, DAILY TEMP.	2.9	5.2	3.1	3.2	2.2	0.9	1.4	1.9	2.3	1.8	3	4.2	1
EXTREME MAXIMUM TEMPERATURE	4.4	9.4	10.6	26.9	28.3	32.8	34.4	33.3	23.9	23.1	12	3.6	34.4
EXTREME MINIMUM TEMPERATURE	-47.8	-47.8	-41.7	-35.7	-16.1	-1.3	1.8	-0.4	-11.1	-20	-38.3	-46.4	-47.8
MEAN RAINFALL	0.2	0.2	0.2	6	19.1	50.5	79.1	60.5	49.1	16.1	0.6	0.1	281.7
MEAN SNOWFALL	20.9	18	21.1	18.8	4.3	0.4	0	0	8	14.8	28.1	32.4	202.3
MEAN TOTAL PRECIPITATION	14.8	13.4	15.6	21.7	25.8	50.8	79.1	60.5	57.3	30.1	20.9	23.8	413.8
STANDARD DEVIATION, TOTAL PRECIPITATION	6.3	7.9	6.7	9.8	21.6	36.4	36.6	26.4	30.2	23.3	17.4	5.7	78
MEAN WIND SPEED	8.6	9.2	10.9	12.3	13.2	12.4	11.4	11.4	12.4	12.4	11.6	9.2	11.3
PREVAILING DIRECTION	ENE	ENE	ENE	ENE	E	ENE	ENE	ENE	ENE	E	E	ENE	ENE
MEDIAN DEPTH OF SNOW COVER cm	40.6	40.6	30.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.3	30.5	

Note: All temperatures in °C, rainfall and precipitation are in mm, snowfall is in cm, and wind speed in km/hr.

Table C-4

Meteorological Summary for Island Falls

STATION	ISLAND FALLS	LATITUDE	55 32 N
PERIOD	1951-1980	LONGITUDE	102 21 W
		ELEVATION	299 m

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	ANNUAL
MEAN DAILY MAXIMUM TEMPERATURE	-19.1	-12.6	-5.0	5.6	14.0	19.5	22.4	20.5	13.1	6.4	-5.2	-14.7	3.7
MEAN DAILY MINIMUM TEMPERATURE	-30.5	-27.2	-21.4	-7.7	0.8	7.5	11.2	9.6	4.1	-1.6	-13.2	-24.3	-7.7
MEAN DAILY TEMPERATURE	-24.8	-20.0	-13.2	-1.1	7.4	13.5	16.9	15.1	8.6	2.4	-9.2	-19.5	-2.0
STANDARD DEVIATION, DAILY TEMP.	2.9	3.6	3.3	3.0	1.9	1.6	1.2	1.6	1.9	2.0	2.7	3.9	0.8
EXTREME MAXIMUM TEMPERATURE	10.0	11.7	15.0	28.5	32.8	34.4	36.1	33.9	33.3	26.7	13.0	7.8	36.1
EXTREME MINIMUM TEMPERATURE	-48.9	-47.8	-43.9	-35.0	-20.6	-3.3	0.6	-1.1	-8.3	-21.7	-37.8	-46.1	-48.9
MEAN RAINFALL	0.1	T	0.1	6.2	38.0	67.1	86.4	66.3	61.4	22.7	2.0	0.1	350.4
MEAN SNOWFALL	24.5	21.4	23.1	13.6	5.4	0.5	0.0	0.0	2.6	12.0	30.5	33.5	167.1
MEAN TOTAL PRECIPITATION	23.8	20.5	22.8	19.7	43.3	67.5	86.4	66.3	64.0	34.6	31.9	32.7	513.5
STANDARD DEVIATION, TOTAL PRECIPITATION	10.6	9.7	14.4	10.9	28.3	37.4	35.2	26.0	37.6	15.9	19.1	12.7	62.3
MEAN WIND SPEED	10.4	9.8	11.4	12.4	14.3	13.1	12.9	12.5	13.5	13.0	12.1	10.0	12.1
PREVAILING DIRECTION	SW	NE	NE	NE	NE	NE	NE	NE	NE	NE	SW	SW	NE
MEDIAN DEPTH OF SNOW COVER cm	40.6	50.8	40.6	5.1	0.0	0.0	0.0	0.0	0.0	0.0	20.3	30.5	

Note: All temperatures in °C, rainfall and precipitation are in mm, snowfall is in cm, and wind speed in km/hr.

Table C-5

Meteorological Summary for La Ronge

STATION LA RONGE A
PERIOD 1951-1980

LATITUDE 55 09 N
LONGITUDE 105 15 W
ELEVATION 375 m

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	ANNUAL
MEAN DAILY MAXIMUM TEMPERATURE	-17.5	-10.9	-3.8	6.7	14.5	20.1	22.6	20.9	14.1	7.9	-3.7	-12.8	4.8
MEAN DAILY MINIMUM TEMPERATURE	-27.8	-23.7	-17.5	-6.0	1.4	7.8	10.8	9.4	4.1	-1.0	-12.1	-22.0	-6.4
MEAN DAILY TEMPERATURE	-22.6	-17.3	-10.7	0.4	8.0	14.0	16.7	15.2	9.1	3.5	-7.9	-17.4	-0.8
STANDARD DEVIATION, DAILY TEMP.	3.1	4.0	3.2	3.0	2.0	1.3	1.4	1.8	2.0	1.8	3.0	4.4	0.8
EXTREME MAXIMUM TEMPERATURE	7.2	12.8	15.0	28.0	28.4	36.1	35.0	35.0	34.4	27.4	18.0	8.3	36.1
EXTREME MINIMUM TEMPERATURE	-48.3	-45.6	-39.4	-29.8	-8.9	-2.2	1.1	0.0	-7.8	-18.3	-33.9	-41.7	-48.3
MEAN RAINFALL	0.3	0.1	0.4	8.5	38.8	84.4	90.2	62.3	56.3	22.8	1.8	0.3	366.2
MEAN SNOWFALL	22.1	23.4	21.9	13.8	6.7	0.2	0.0	0.0	3.1	9.8	35.1	27.6	163.7
MEAN TOTAL PRECIPITATION	19.7	15.3	15.4	19.8	40.8	84.6	90.2	62.3	58.9	29.9	26.5	21.8	485.2
STANDARD DEVIATION, TOTAL PRECIPITATION	6.8	6.9	14.3	14.6	33.2	61.4	45.3	30.0	36.3	10.4	12.1	5.4	95.7
MEAN WIND SPEED	7.9	8.8	9.4	11.4	12.0	11.1	10.2	10.1	11.2	10.3	9.9	9.0	10.1
PREVAILING DIRECTION	W	W	W	ENE	ENE	E	W	W	E	W	W	W	W
MEDIAN DEPTH OF SNOW COVER cm	40.6	40.6	30.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.3	30.5	

Note: All temperatures in °C, rainfall and precipitation are in mm, snowfall is in cm, and wind speed in km/hr.

Table C-6

Meteorological Summary for Whitesand Dam

STATION WHITESAND DAM
PERIOD 1951-1980

LATITUDE 56 14 N
LONGITUDE 103 09 W
ELEVATION 341 m

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	ANNUAL
MEAN DAILY MAXIMUM TEMPERATURE	-20.1	-13.0	-5.1	5.2	13.0	18.5	21.5	19.6	12.1	5.1	-6.5	-15.7	2.9
MEAN DAILY MINIMUM TEMPERATURE	-29.9	-25.8	-20.4	-7.6	0.2	6.3	9.9	8.7	3.2	-2.3	-13.8	-24.1	-8.0
MEAN DAILY TEMPERATURE	-25.0	-19.4	-12.8	-1.2	6.6	12.4	15.7	14.2	7.7	1.4	-10.2	-20.0	-2.6
STANDARD DEVIATION, DAILY TEMP.	3.3	3.7	3.1	3.0	2.0	1.6	1.3	1.5	2.1	2.2	2.8	4.0	1.0
EXTREME MAXIMUM TEMPERATURE	5.0	7.8	13.9	29.0	34.4	32.2	39.4	35.0	31.1	23.9	14.0	6.1	39.4
EXTREME MINIMUM TEMPERATURE	-47.2	-48.9	-43.9	-36.1	-15.6	-4.4	0.0	-3.9	-8.9	-21.1	-37.8	-43.3	-48.9
MEAN RAINFALL	0.2	T	T	5.6	33.9	67.5	74.8	65.5	60.4	21.2	0.7	T	329.8
MEAN SNOWFALL	21.7	20.2	24.7	15.4	5.3	0.4	0.0	0.0	3.2	12.7	34.9	32.9	171.4
MEAN TOTAL PRECIPITATION	21.8	20.2	24.8	21.0	39.2	67.9	74.8	65.5	63.6	33.9	35.6	32.9	501.2
STANDARD DEVIATION, TOTAL PRECIPITATION	11.0	9.7	14.3	12.1	23.6	29.9	34.0	26.6	36.0	18.4	21.2	12.8	82.4
MEAN WIND SPEED													
PREVAILING DIRECTION													
MEDIAN DEPTH OF SNOW COVER cm	40.6	50.8	40.6	5.1	0.0	0.0	0.0	0.0	0.0	0.0	20.3	30.5	

Note: All temperatures in °C, rainfall and precipitation are in mm, snowfall is in cm, and wind speed in km/hr.

Table C-7

Summary of Annual Normal Climatological Data

	Brabant Lake	Collins Bay	Cree Lake	Island Falls	La Ronge	Whitesand Dam
Days with Frost	226	230	222	220	246	227
Days with Snowfall	69	101	87	66	76	58
Days with Rain	67	67	68	71	75	72
Mean Rainfall (mm)	329	308	282	350	366	330
Mean Snowfall (cm)	233	349	202	467	164	171
Total Precipitation (mm)	530	523	414	514	485	501
Days with Precipitation	114	144	127	134	137	128
Greatest Rainfall in 24 hours (mm)	47	54	73	69	78	61
Probable Maximum Precipitation in 24 hour Period (mm)	285	255	355	280	340	280

Table C-8

Air Quality - Star Lake

Location	SO3 Equivalent (mg/100 cm2/30 days)	Particulates (mg/100 cm2/30 days)
Star Lake - N. E. Arm	0.330-1.860	0.1850-2.1310
David Lake - Outlet	0.040-1.170	0.6600-0.1277
Rush Lake - Outlet	0.020-6.000	0.9310-0.5473
Blindman Lake - Outlet	0.023-0.840	0.4060-0.4536

(from Clifton Associates Ltd., 1986)

Table C-9

Summary of Results from Lake Bottom Study

Element	Units	Range	Mean	Standard Deviation
Zinc	ppm	4-7100	97.2	120.4
Copper	ppm	1-1600	35.0	32.6
Lead	ppm	1-510	3.4	8.8
Nickel	ppm	1-280	29.4	17.2
Cobalt	ppm	1-190	11.9	7.9
Silver	ppm	0.1-3.2	0.2	0.2
Manganese	ppm	30-89000	790.0	2673.0
Uranium	ppm	0.2-112.6	3.3	5.3
Arsenic	ppm	0.5-76	3.3	3.2
Molybdenum	ppm	1.-69	2.6	1.8
Iron	%	0.1-30	3.0	2.2

(from Hornbrook and Garrett, 1976)

Table C-10

Summary of Analyses on Lake Sediments

Parameter	Units	Star July '84	David July '84	Rush July '84	Fafard 1974	Steephill 1974	Royal 1974	The Two Rivers 1974	Iskwatam 1974	Wintego 1974	Wapumon 1974	Pita 1974
NUTRIENTS												
Carbon - inorganic	%	0.61	0.58	0.52								
Carbon - organic	%	1.29-21.	2.55	18.1								
Carbon - total	%	1.9-21.6	26.1	18.6								
Nitrogen - Ammonia	%	0.1-1.44	1.31	1.37								
Total Kjeldahl Nitrogen	ppm	1070-14400	13100	13700	1300-1900	1300-4700	500-1600	1400-2600	4600-5700	700-5800	3700-6400	4800-5800
Phosphorous - total	ppm	620-1100	740	1060	3600-4600	1300-4700	2600-3800	1400-2600	4000-5100	700-5800	3500-5600	3800-5300
TRACE CONSTITUENTS												
Arsenic	ppm	1.2-4.2	1.8	5.6								
Cyanide	ppm	-	-	-								
Fluoride	ppm	-	-	-								
Mercury	ppm	0.03-0.2	0.14	0.56	0.10-0.19	0.13-0.97	0.05-0.22	0.11-0.56	0.14-0.48	0.07-0.17	0.11-0.48	0.12-0.37
Selenium	ppm	13-280	10	31								
Sulfide (D.E.)	ppm	310-2400	2000	2200								
METALS												
Cadmium	ppm				<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	ppm				64-102	92-132	57-126	90-140	128-150	45-174	127-157	154-162
Copper	ppm	14-91	51	28	10.-15.	12.-22.	11.-23.	13.-20	15.-21	6.-21	19.-28	19.-25
Gold	ppm	-	-	-								
Iron	ppm	-	-	-	1.92-3.76	2.60-4.20	1.92-4.66	2.30-4.90	4.68-5.80	1.85-6.42	4.98-6.16	5.36-5.86
Lead	ppm	7.4-8.9	26	15	<5	<5	<5	<5	<5	<5-6	<5-5	<5
Nickel	ppm	66-170	46	46	19-28	25-44	21-47	29-37	33-47	22-58	47-52	48-55
Zinc	ppm	72-76	115	110	48-78	70-114	58-102	76-106	95-104	35-127	103-135	109-132

(from Clifton Associates Ltd., 1986 and Sawchyn, 1975)

Table C-11

Summary of Grain Size Analyses
(from Schreiner, 1986)

	SANDY TILL			SILT		
	MEAN (wt %)	STANDARD DEVIATION (wt %)	NUMBER OF SAMPLES	MEAN (wt %)	STANDARD DEVIATION (wt %)	NUMBER OF SAMPLES
SAND	71	10	141	15	14	108
SILT	25	8	141	62	13	108
CLAY	4	2	141	23	14	108
	SILTY TILL			CLAY		
SAND	45	9	23	5	5	112
SILT	49	9	23	27	11	112
CLAY	6	2	23	68	13	112
	CLAYEY TILL			COLLUVIUM		
SAND	39	17	75	23	12	5
SILT	38	12	75	43	21	5
CLAY	23	12	75	34	30	5
	SAND & GRAVEL					
SAND	82	17	110			
SILT	15	15	110			
CLAY	3	4	110			

Table C-12

Summary of Grain Size Analyses
(from Campbell, 1986a)

	SILT-SAND TILL				SANDY TILL			
	MINIMUM (wt%)	MAXIMUM (wt%)	MEAN (wt%)	STANDARD DEVIATION	MINIMUM (wt%)	MAXIMUM (wt%)	MEAN (wt%)	STANDARD DEVIATION
SAND	47.1	77.4	61.46	8	79.9	90.7	85.01	3.81
SILT	18.4	48.8	34.55	7.63	7.2	18.6	11.38	3.56
CLAY	0	13.1	4.01	2.36	1.1	9.5	3.61	2.48
	SILTY TILL				CLAY-SILT			
SAND	15	45.9	36.23	7.33	9	66	26	0
SILT	34.9	70.8	54.32	8.5	27	84	59.5	0
CLAY	1.9	26	9.45	6.04	0	31	13.8	0

Table C-13

Summary of Engineering Properties for Clay (from Shawinigan, 1973)

	Average	Range
Natural moisture content (%)	27	24-35
Atterberg Limits		
Liquid Limit (%)	48	38-56
Plastic Limit (%)	22	16-25
Plasticity Index (%)	26	20-30
Unconfined Compressive Strength (kPa)	145	--
Compressive Index	0.2	--

Table C-14

Summary of Field Permeability Results

Formation or Rock Type	RQD Range	Range of k (m/s)	Number of Tests	Median k (m/s)
Monzonite Intact (Weathered)	60-100 typically >90	2.4 X 10-8 to 8.7 X 10-7	15	2.1 X 10-7
Granodiorite Intact (Weathered)	60-100 typically >90	3.3 X 10-7 to 7.6 X 10-8	4	1.6 X 10-7
Granodiorite (Highly Weathered)	60-70	1.1 X 10-6 to 3.0 X 10-7	3	1.1 X 10-6
Mafic Dyke (Highly Fractured)	--	7.0 X 10-5	1	7.0 X 10-5
Till	--	7.9 X 10-6	1	7.9 X 10-6

(from Clifton Associate Ltd., 1986)

Table C-15

Groundwater Quality Summary from Star Lake Project

Piezometer Number		P101	P102	P102A	P103	P103A	P104	P105
Stratum		Bedrock	Bedrock	Overburden	Bedrock	Overburden	Bedrock	Bedrock
Date Sampled (y/m/d)		85/02/27	85/02/27	85/02/28	85/03/03	85/02/27	85/02/28	85/03/03
Parameter	Units							
PHYSICAL PROPERTIES								
Field Temperature	°C	1	1	1	1	1	1	1
Laboratory Conductivity	us/cm	71	102	54	113	48	107	N/A
Laboratory pH	pH units	7.4	7.7	4.5	8.2	6.8	8.1	7.5
Total Alkalinity	mg/L	56	115	0	139	49	145	77
Total Hardness	mg/L	108	160	64	124	64	140	84
Total Dissolved Solids	mg/L	128	256	37	278	108	258	158
MAJOR IONS								
Calcium	mg/L	30	45	22	29	13	40	29
Magnesium	mg/L	8	12	2	13	8	10	3
Potassium	mg/L	4.6	3.9	3.8	21	7.7	4.1	5.8
Sodium	mg/L	18	10	<1	23	<1	17	3
Bicarbonate	mg/L	68	140	0	169	60	177	93
Chloride	mg/L	4	2	<2	10	2	2	10
Nitrate	mg/L	1	1	1	<1	<1	<1	<1
Sulphate	mg/L	<10	17	12	35	25	12	20
NUTRIENTS	mg/L							
Nitrogen - Ammonia	mg/L	0.26	0.13	0.03	0.21	0.28	0.16	0.24
Total Kjeldahl Nitrogen	mg/L	1.1	0.8	0.5	0.8	0.9	0.8	0.7
Phosphorous - inorganic	mg/L	0.2	0.06	<0.05	0.07	0.08	0.07	0.05
Ortho-Phosphate	mg/L	0.04	0.04	0.02	0.05	0.04	0.04	0.05
Phosphate - total	mg/L	0.2	0.03	0.04	0.05	0.09	0.02	0.07
METALS								
Aluminum	mg/L	11	0.15	0.36	1.4	7	0.18	3.8
Barium	mg/L	0.085	0.068	0.035	0.066	0.22	0.038	0.14
Beryllium	mg/L	0.003	<0.001	<0.001	<0.001	0.003	<0.001	0.001
Cadmium	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.034	0.005	0.003	0.053	0.035	0.005	0.022
Cobalt	mg/L	0.006	<0.001	0.001	0.007	0.006	0.001	<0.001
Copper	mg/L	0.027	0.002	0.004	0.013	0.038	0.002	0.02
Iron	mg/L	6	0.15	0.44	1.6	8.5	0.11	3.8
Lead	mg/L	0.006	<0.005	<0.005	0.01	<0.005	<0.005	0.006
Manganese	mg/L	0.1	0.081	0.024	0.057	0.15	0.13	0.036
Molybdenum	mg/L	0.01	<0.005	0.008	0.01	0.01	0.03	<0.005
Nickel	mg/L	0.016	0.005	0.007	0.018	0.053	0.006	0.006
Silicon	mg/L	4.2	0.3	0.2	0.2	1	0.7	1.3
Silver	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Titanium	mg/L	0.01	0.006	0.016	0.048	0.3	0.002	0.14
Tungsten	mg/L	<0.005	<0.005	<0.005	0.01	<0.005	0.005	<0.005
Vanadium	mg/L	0.01	<0.01	<0.01	0.01	0.02	<0.01	0.01
Zinc	mg/L	0.084	0.014	0.014	0.018	0.047	0.022	0.046
TRACE CONSTITUENTS								
Arsenic	mg/L	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Boron	mg/L	0.02	0.02	0.01	0.09	0.02	0.04	0.02
Bromide	mg/L	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cyanide	ug/L	<0.01	<0.1	0.2	<0.1	<0.1	<0.1	<0.1
Mercury	ug/L	9.5	<0.05	<0.05	<0.05	0.05	<0.05	2.3
Sulfide (D.E.)	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
RADIONUCLIDES								
Radium 226, total	Bq/L	0.07	0.01	<0.005	0.01	0.06	0.03	0.01
Uranium, total	g/L	3.3	1.9	<0.5	1.6	1.0	1.2	<0.5

(from Clifton Associates Ltd., 1986)

APPENDIX C-2. FIGURES

APPENDIX C-2. FIGURES

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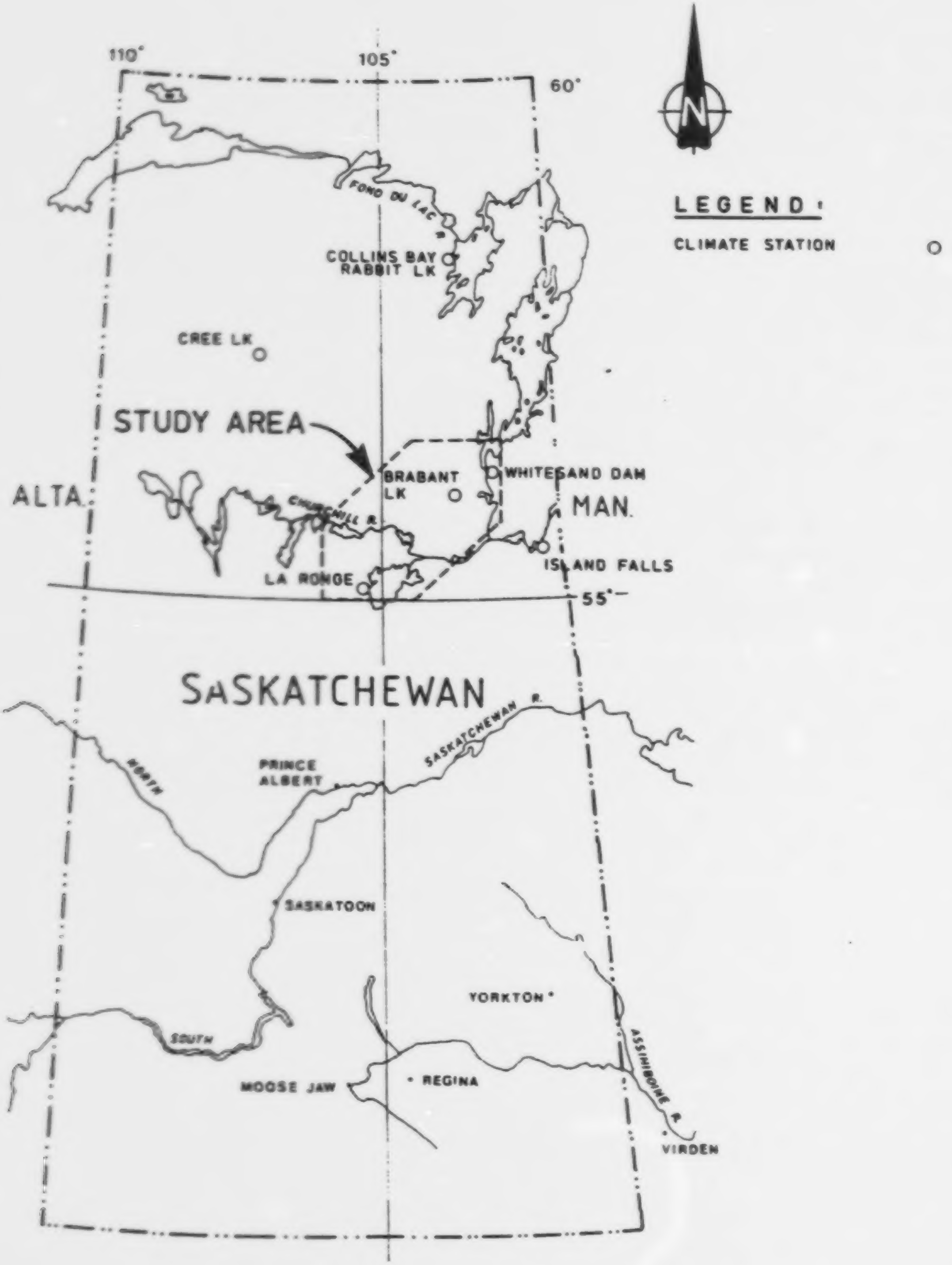
110°
105°
60°
N
LEGEND:
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FOND DU LAC R.
COLLINS BAY
RABBIT LK
CREE LK
STUDY AREA
BRABANT LK
WHITESAND DAM
ALTA.
MAN.
CHURCHILL R.
ISLAND FALLS
LA RONGE
55°
SASKATCHEWAN
NORTH
SASKATCHEWAN R.
PRINCE ALBERT
SASKATOON
YORKTON
SOUTH
MOOSE JAW
REGINA
ASSINIBOINE R.
VIRDEN

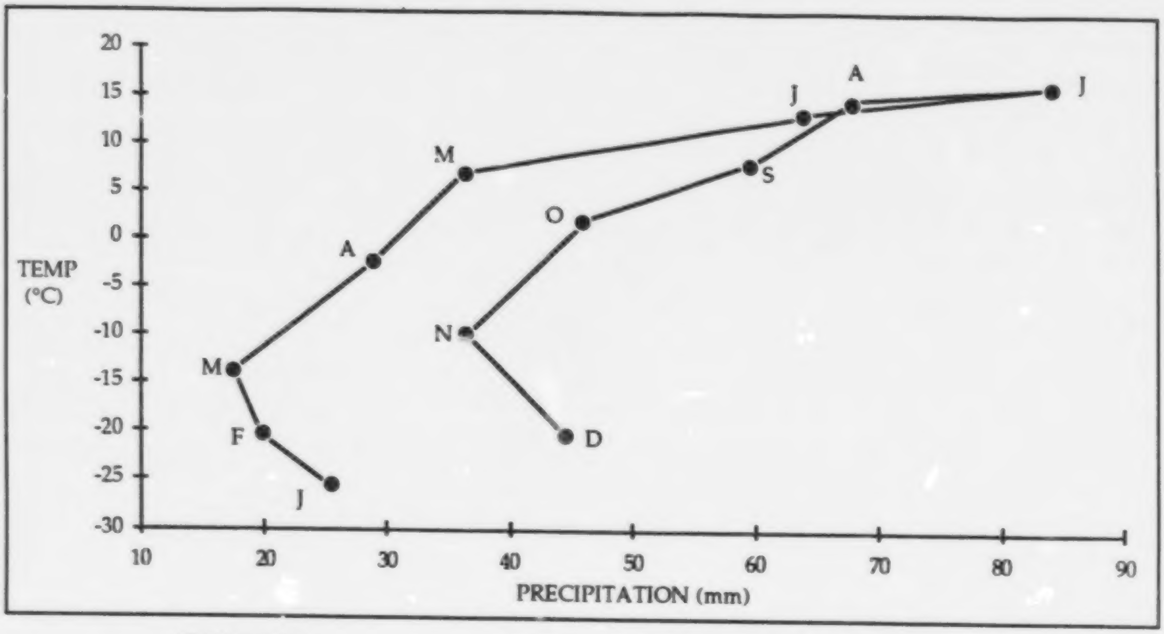

FIGURE C-2 HYTHERPLOT FOR BRABANT LAKE

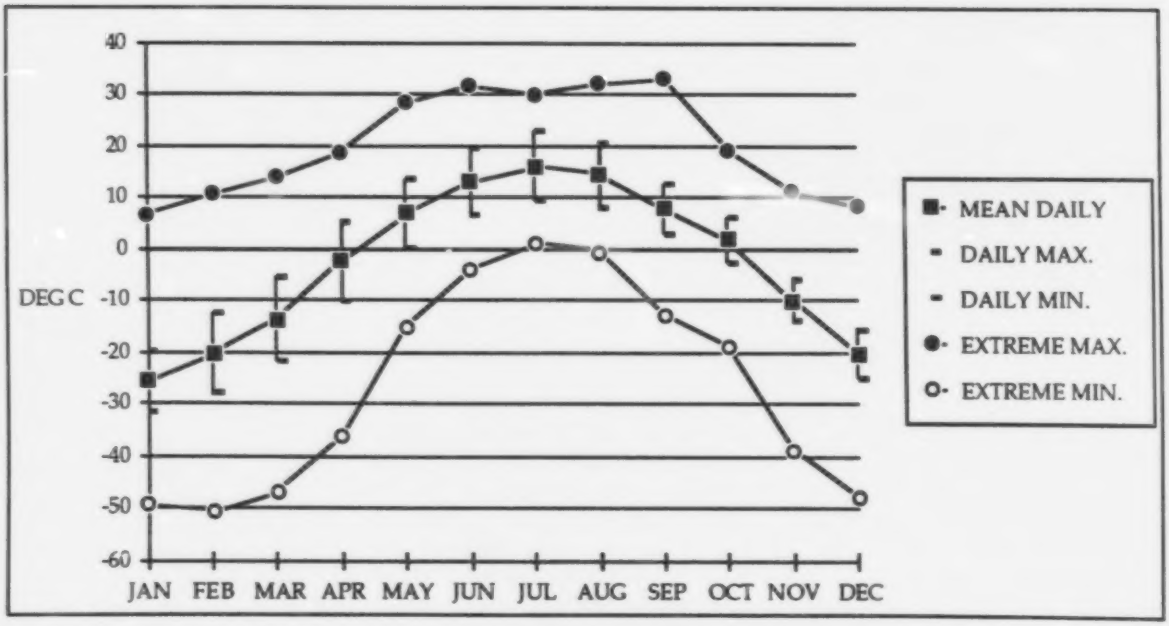

FIGURE C-3 TEMPERATURE FOR BRABANT LAKE

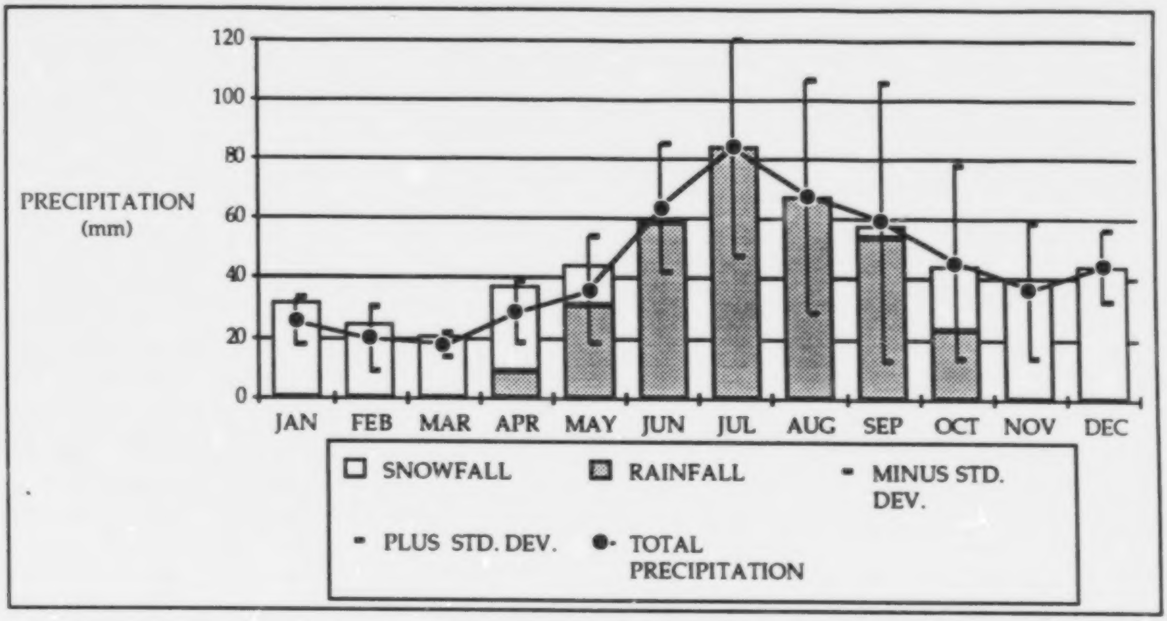

FIGURE C-4 PRECIPITATION FOR BRABANT LAKE

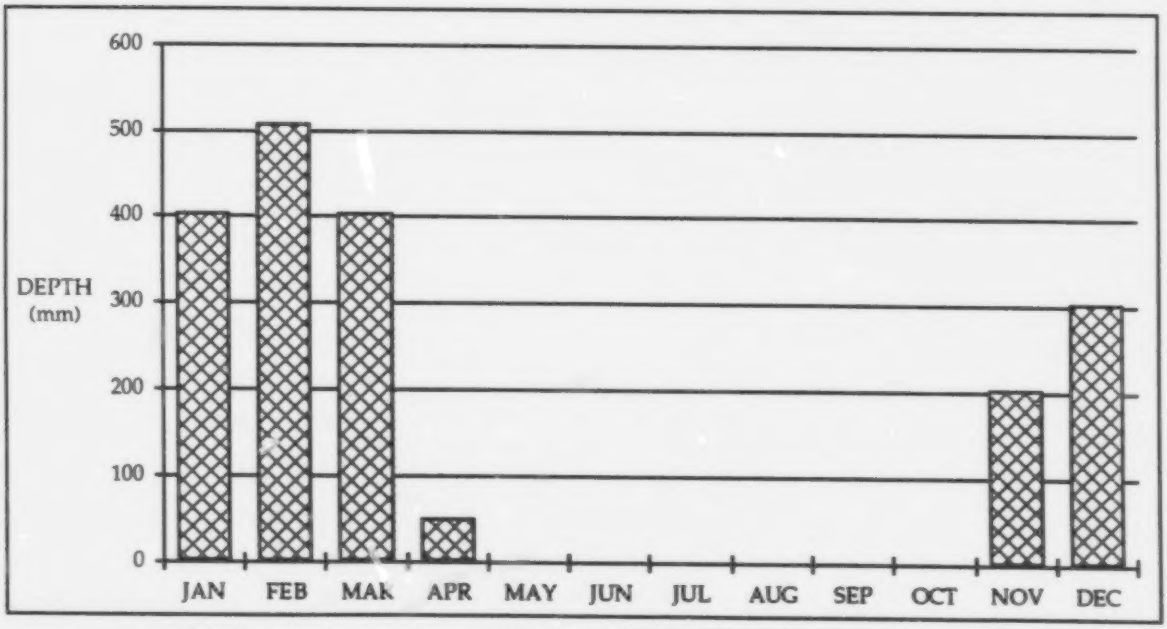

FIGURE C-5 MEDIAN SNOW DEPTH FOR BRABANT LAKE

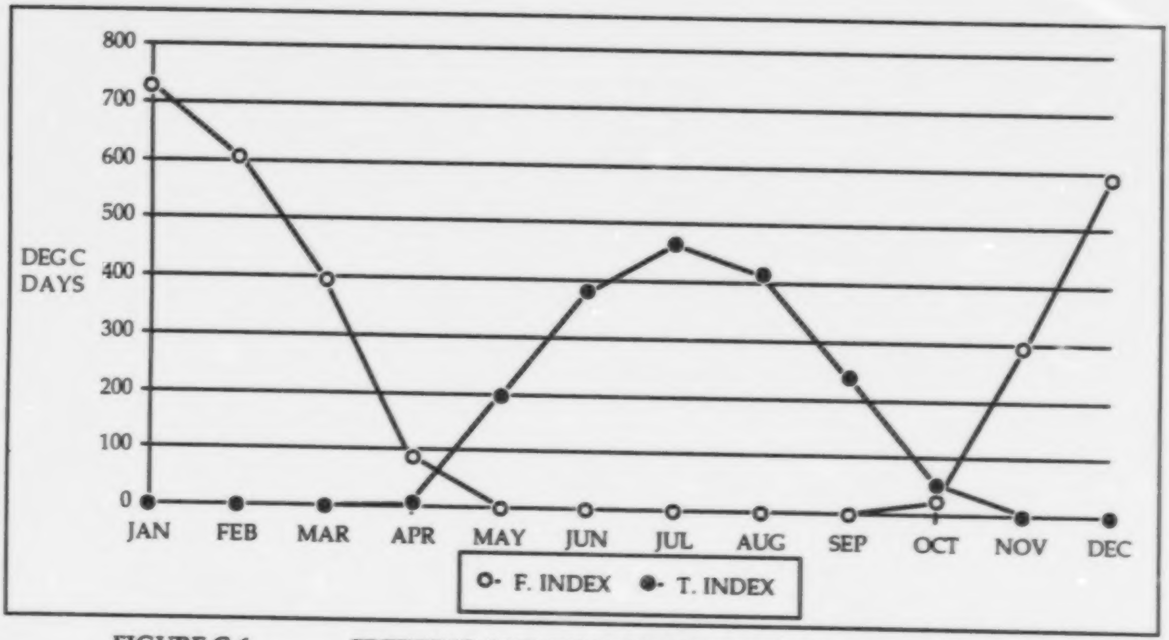

FIGURE C-6 FREEZING AND THAWING INDICES FOR BRABANT LAKE

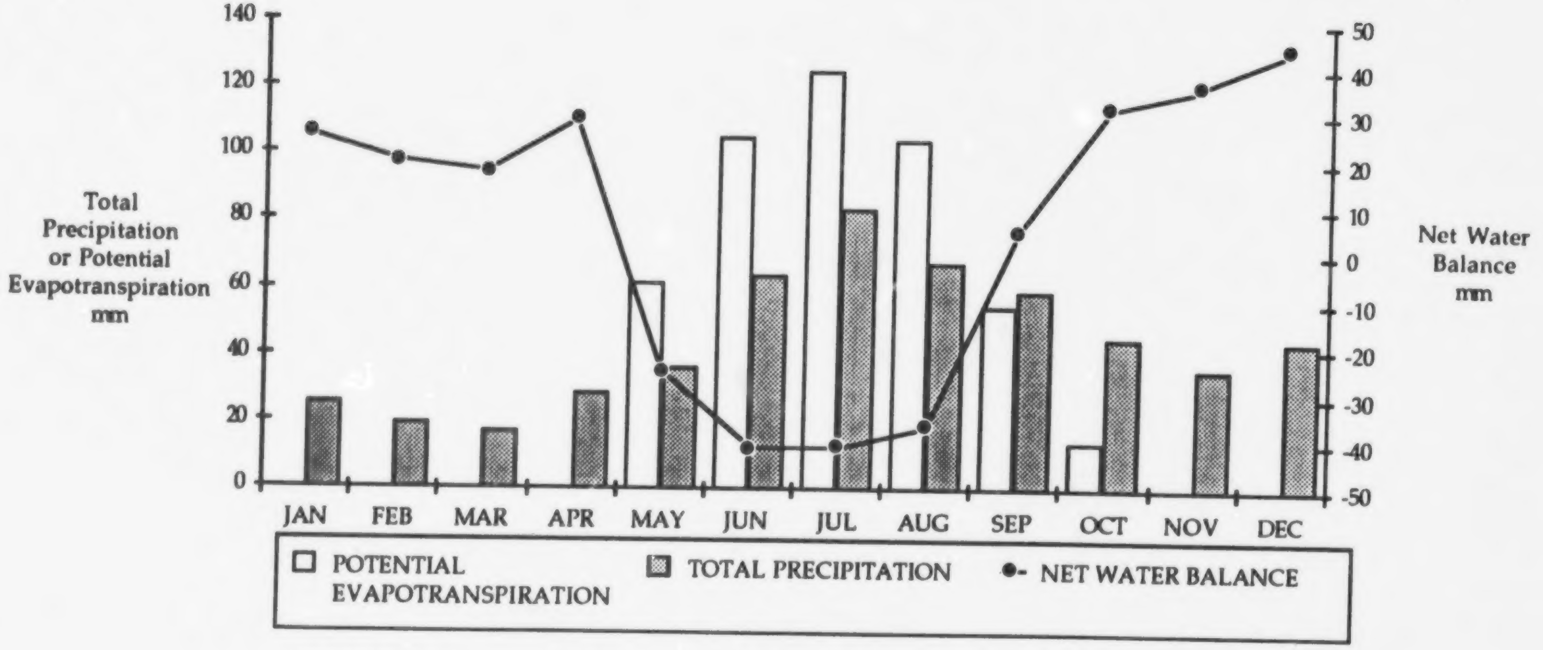

FIGURE C-7 POTENTIAL EVAPOTRANSPIRATION FOR BRABANT LAKE

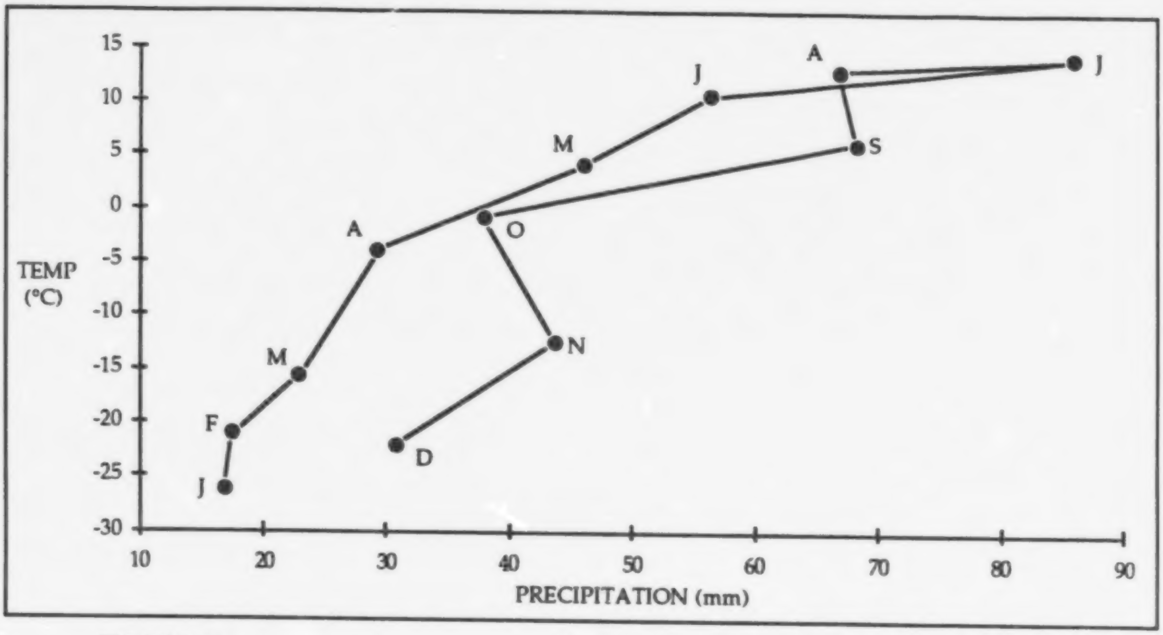

FIGURE C-8 HYTHERPLOT FOR COLLINS BAY

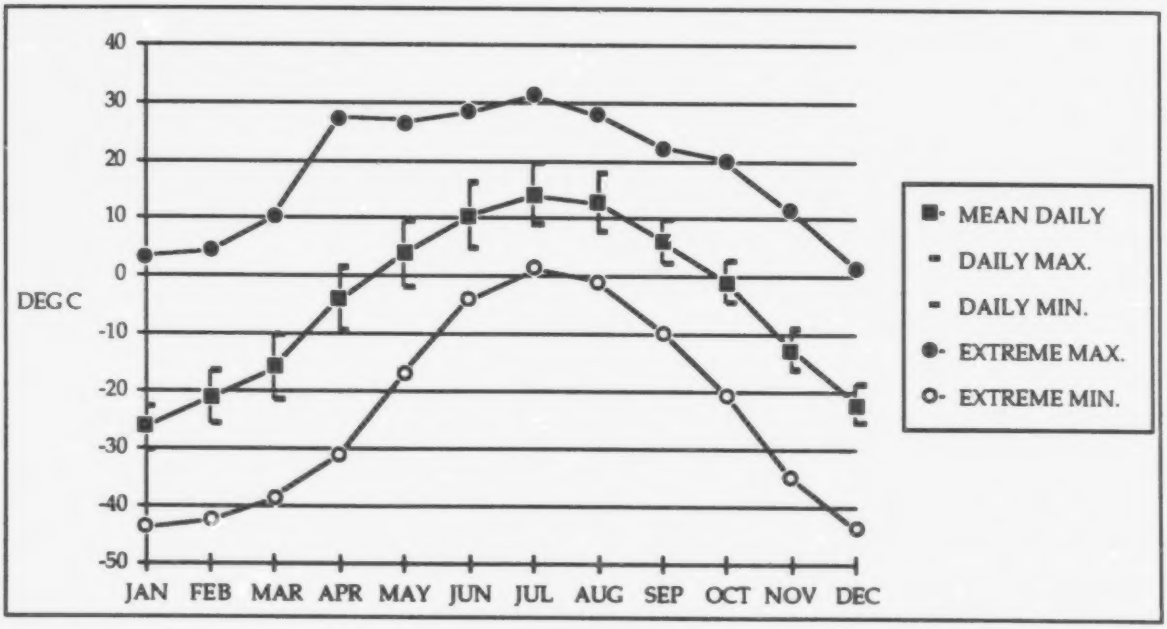

FIGURE C-9 TEMPERATURE FOR COLLINS BAY

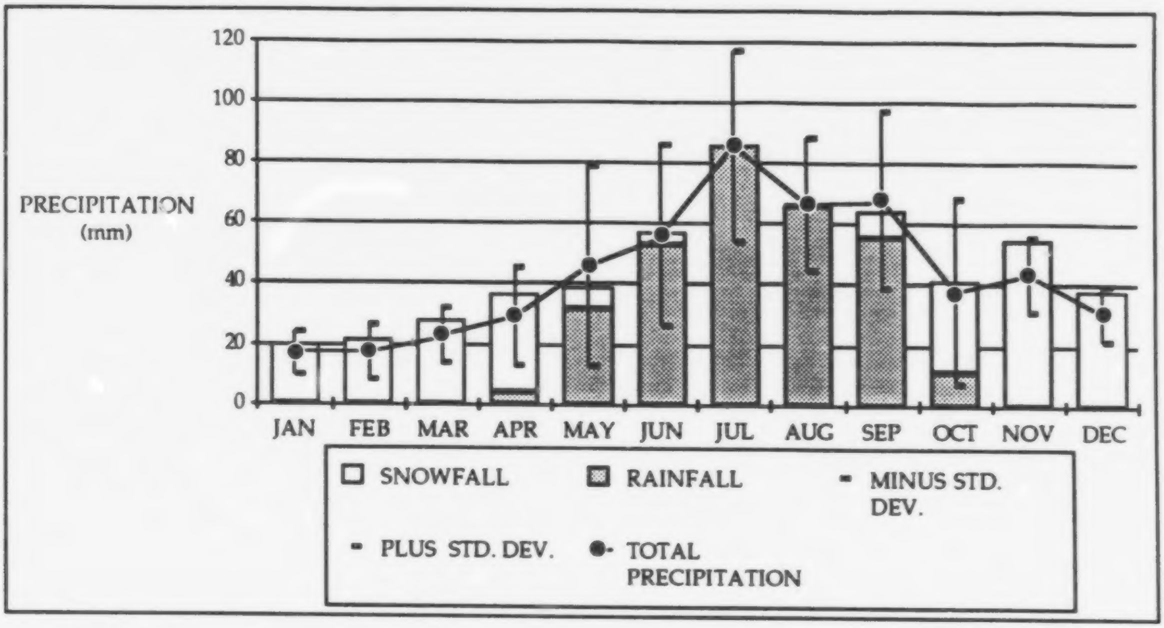

FIGURE C-10 PRECIPITATION FOR COLLINS BAY

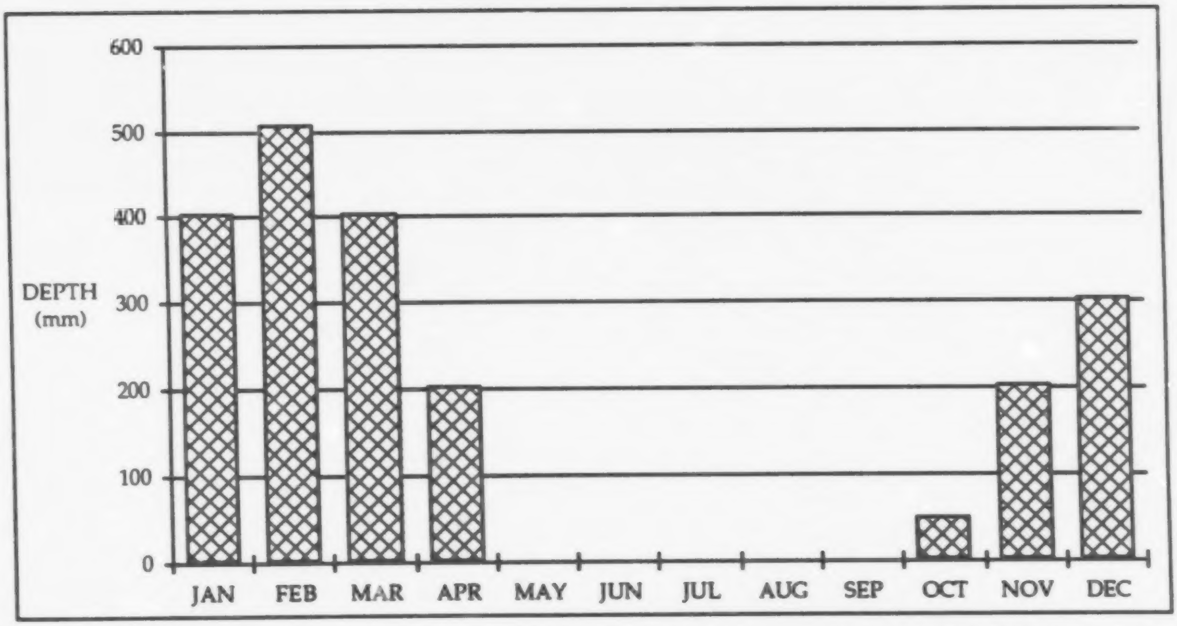

FIGURE C-11 MEDIAN SNOW DEPTH FOR COLLINS BAY

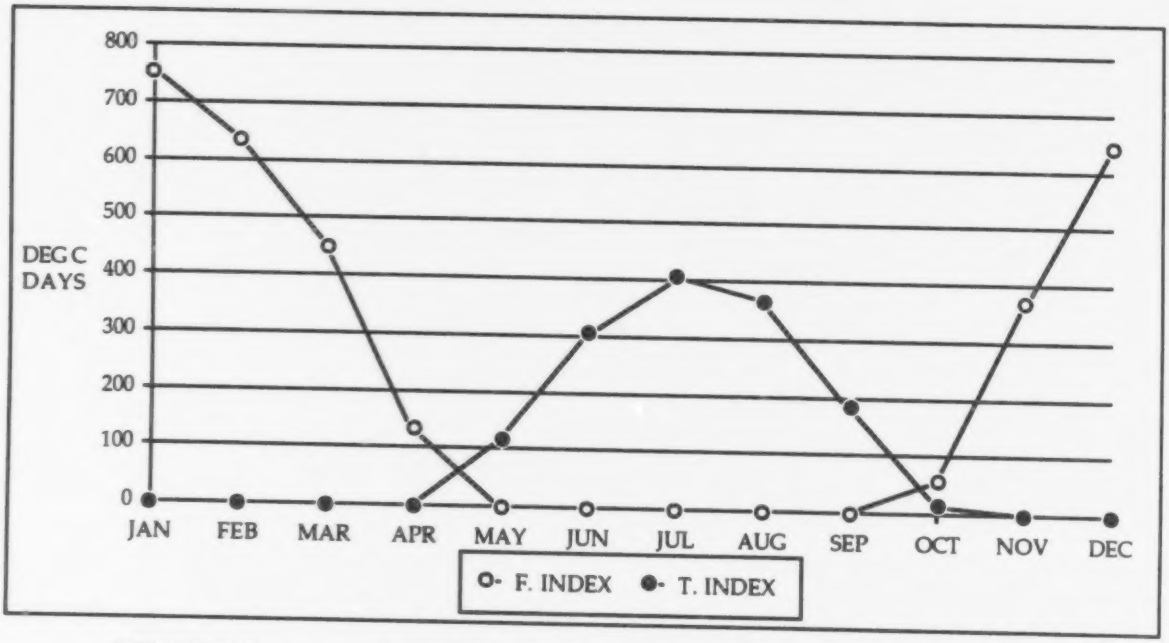

FIGURE C-12 FREEZING AND THAWING INDICES FOR COLLINS BAY

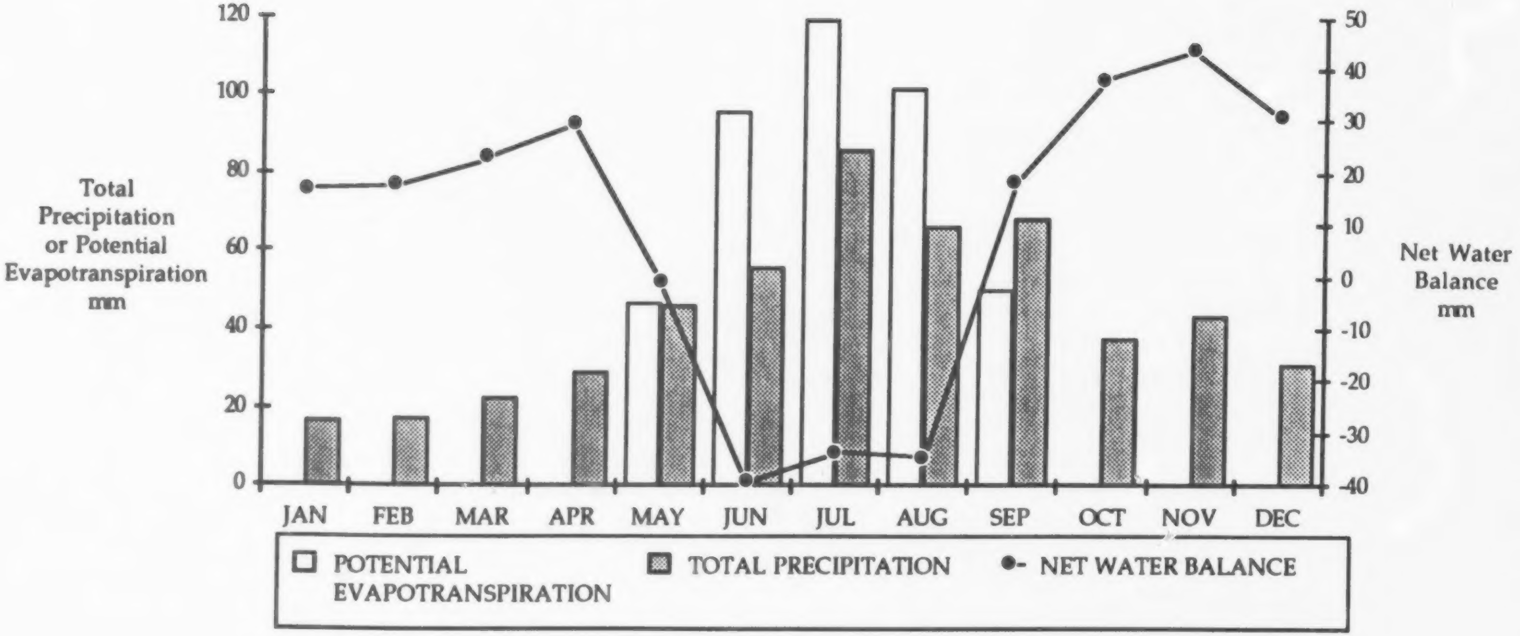

FIGURE C-13 POTENTIAL EVAPOTRANSPIRATION FOR COLLINS BAY

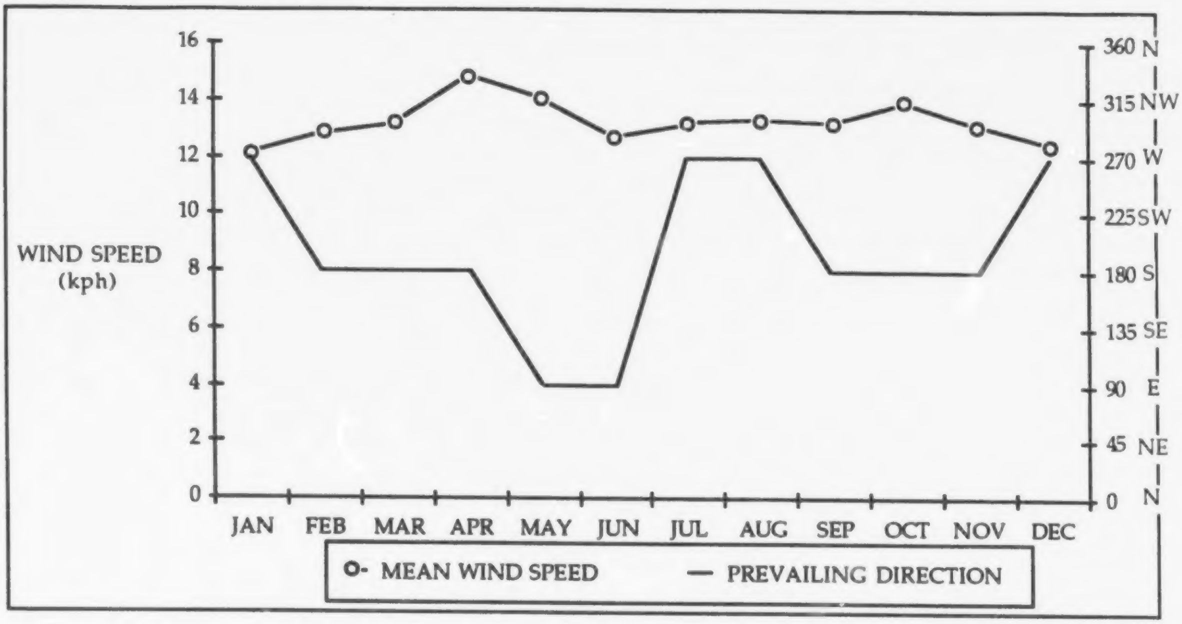

FIGURE C-14 MEAN WIND SPEED AND PREVAILING DIRECTION FOR COLLINS BAY

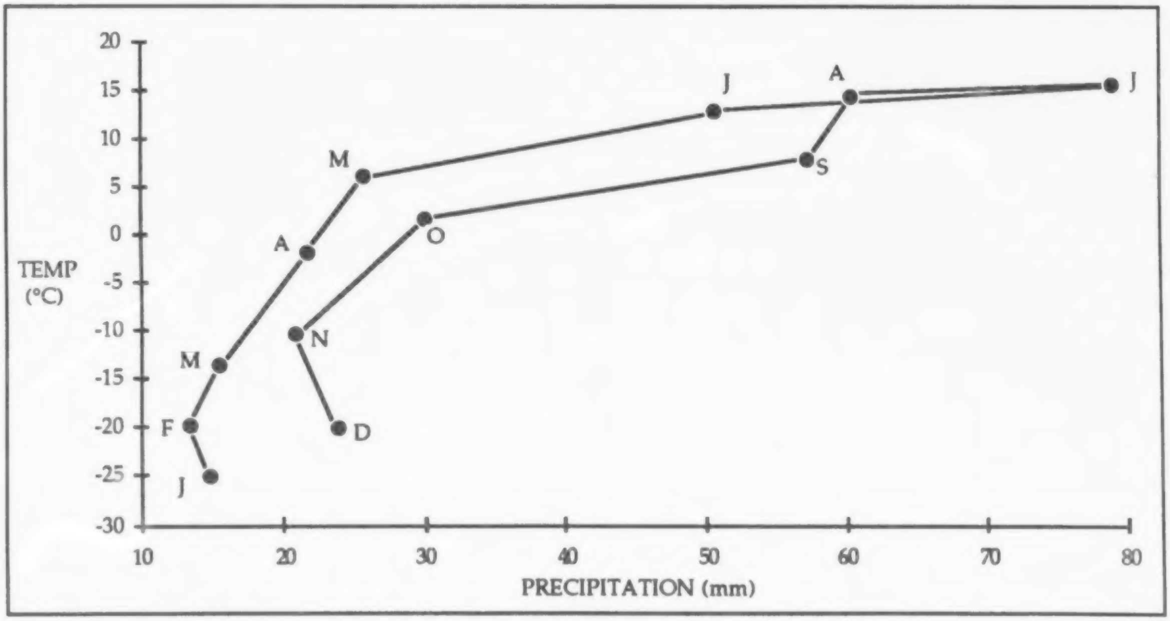

FIGURE C-15 HYTHERPLOT FOR CREE LAKE

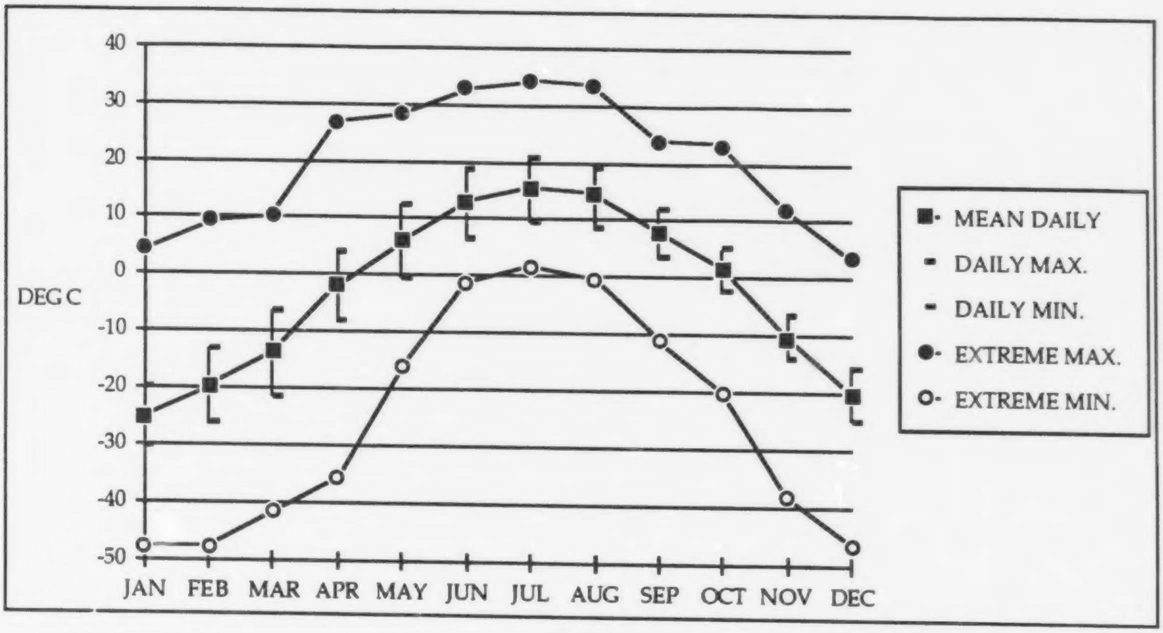

FIGURE C-16 **TEMPERATURE FOR CREE LAKE**

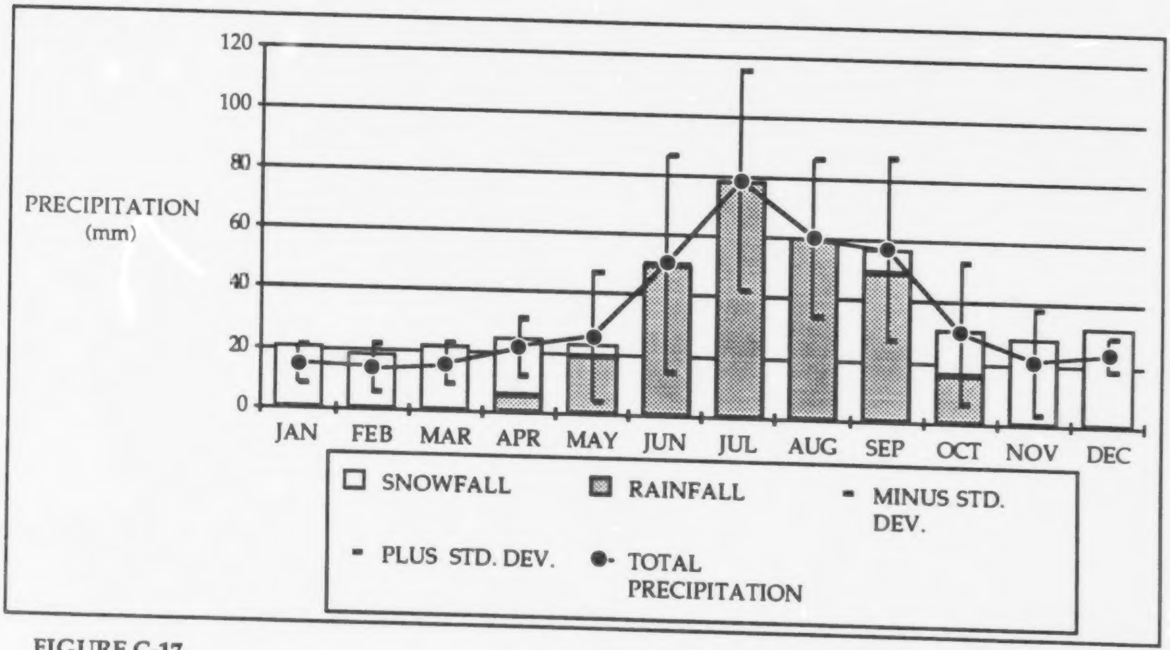

FIGURE C-17 **PRECIPITATION FOR CREE LAKE**

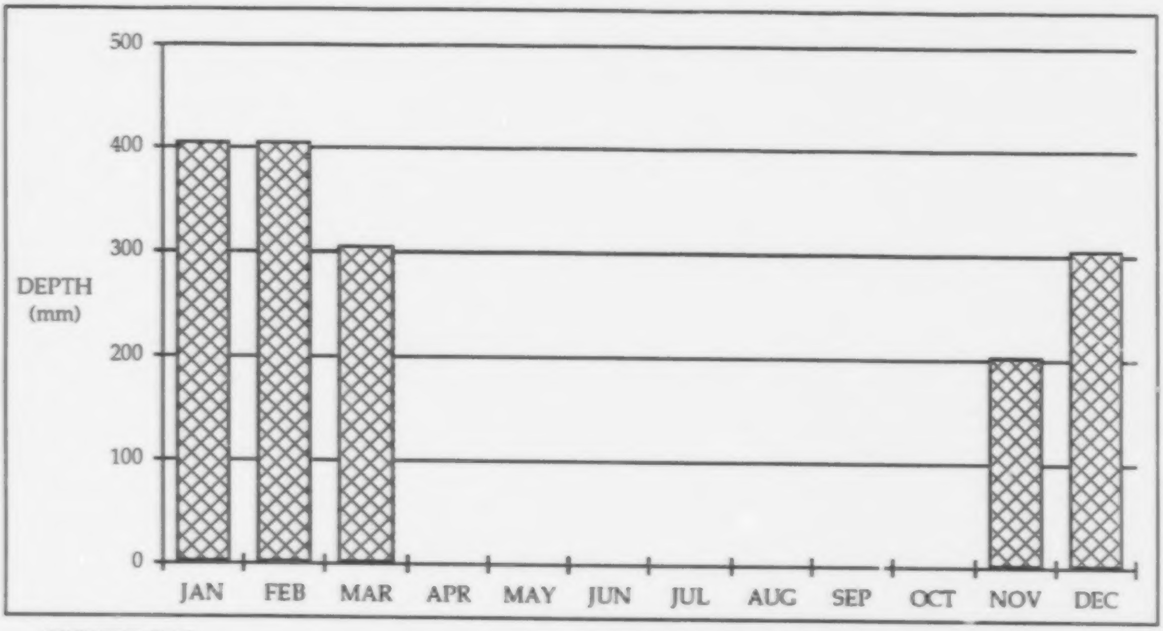

FIGURE C-18 MEDIAN SNOW DEPTH FOR CREE LAKE

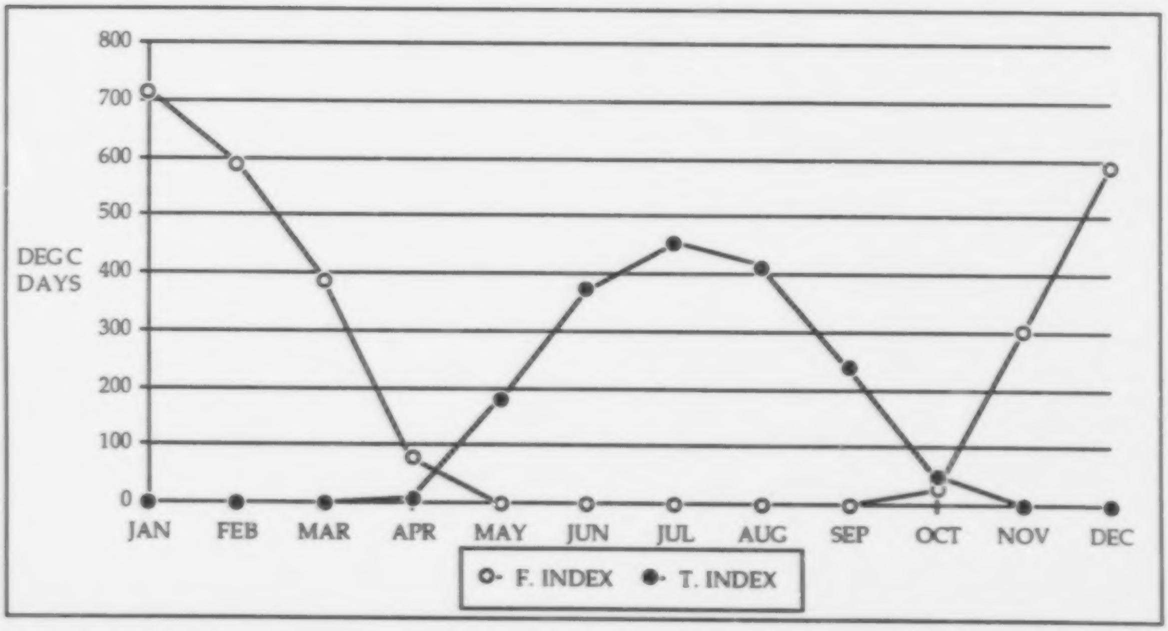

FIGURE C-19 FREEZING AND THAWING INDICES FOR CREE LAKE

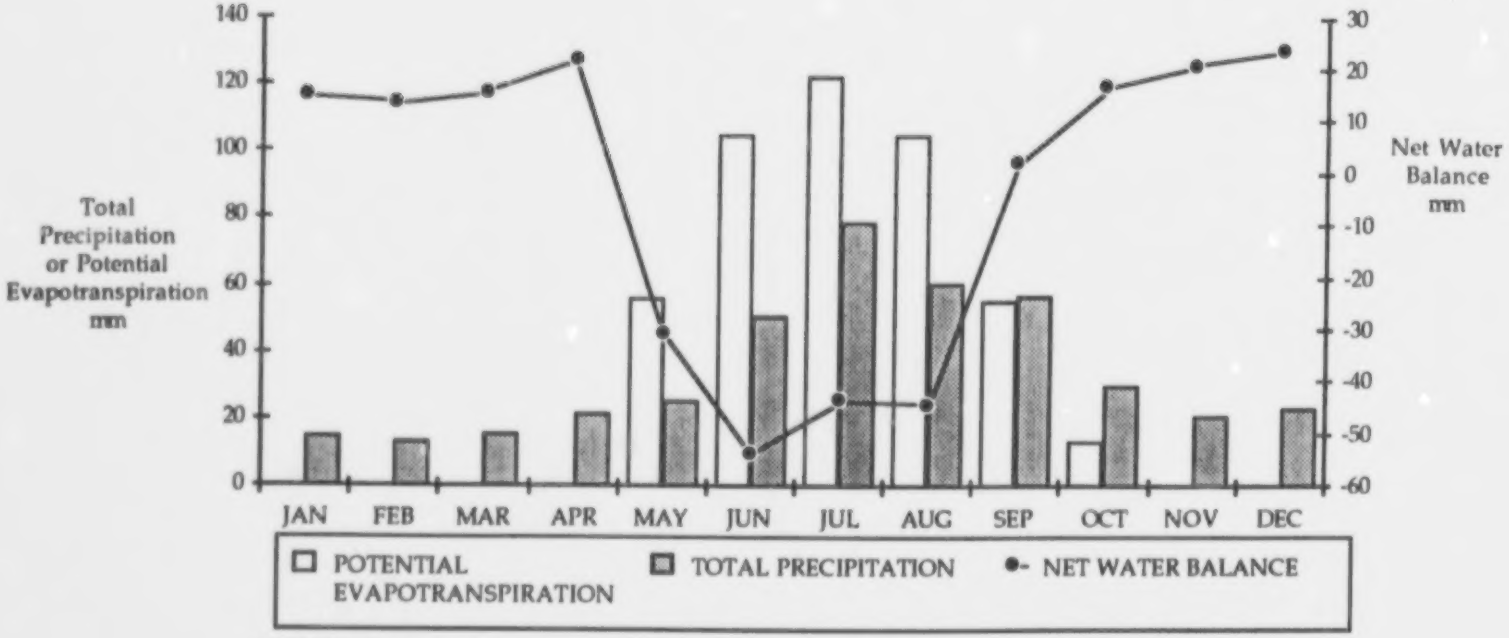

FIGURE C-20 POTENTIAL EVAPOTRANSPIRATION FOR CREE LAKE

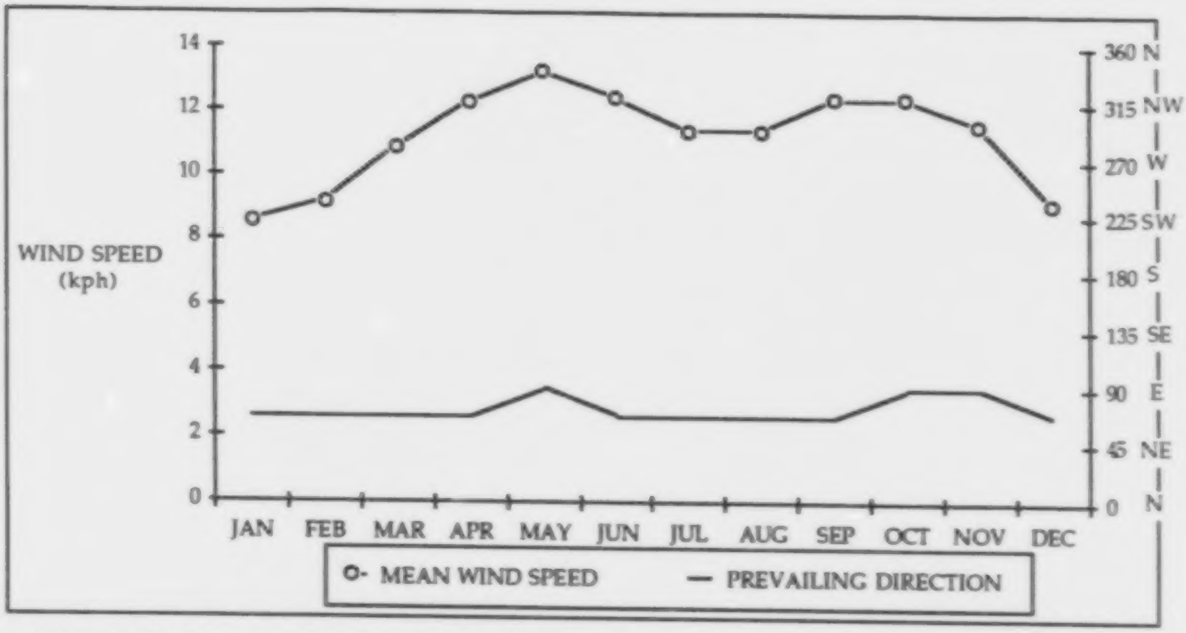

FIGURE C-21 MEAN WIND SPEED AND PREVAILING DIRECTION FOR CREE LAKE

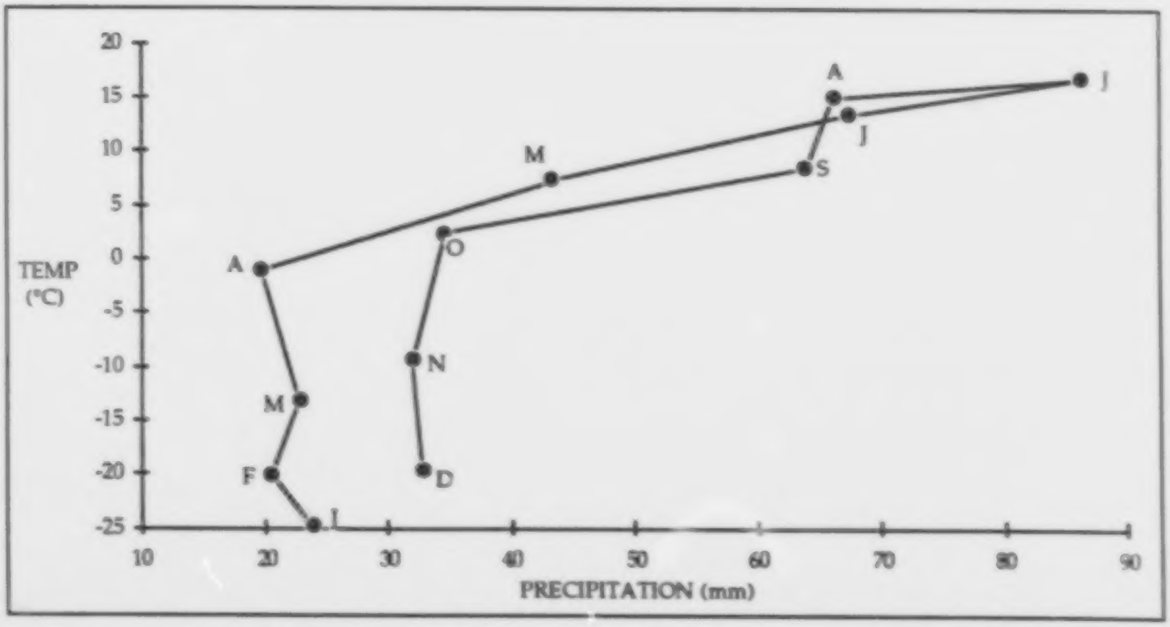

FIGURE C-22 HYTHERPLOT FOR ISLAND FALLS

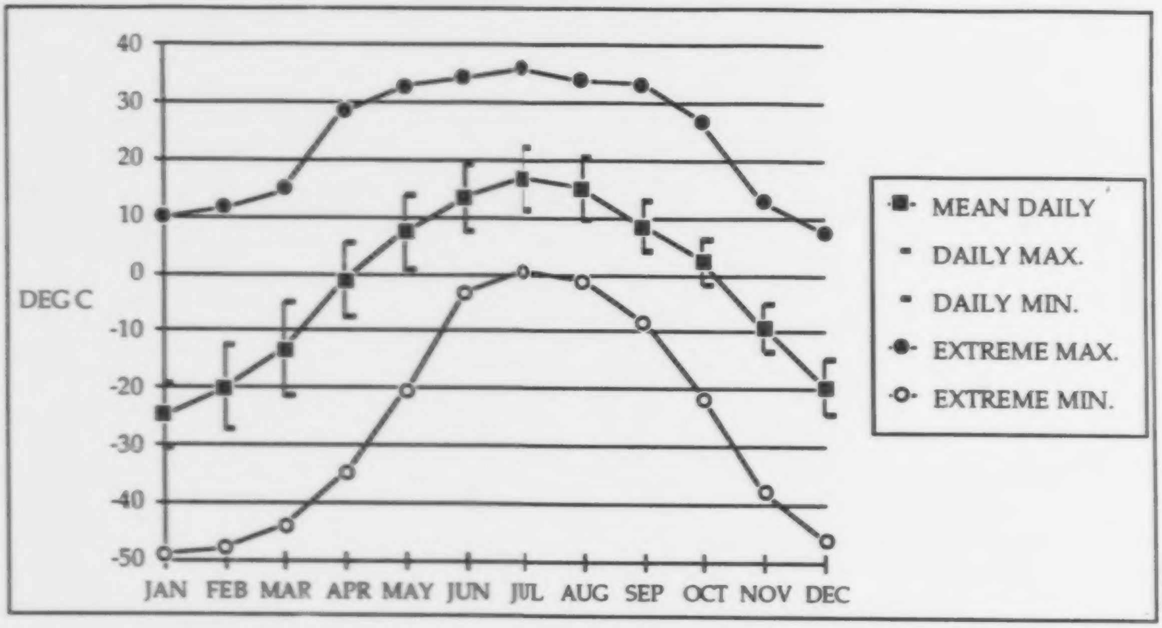

FIGURE C-23 TEMPERATURE FOR ISLAND FALLS

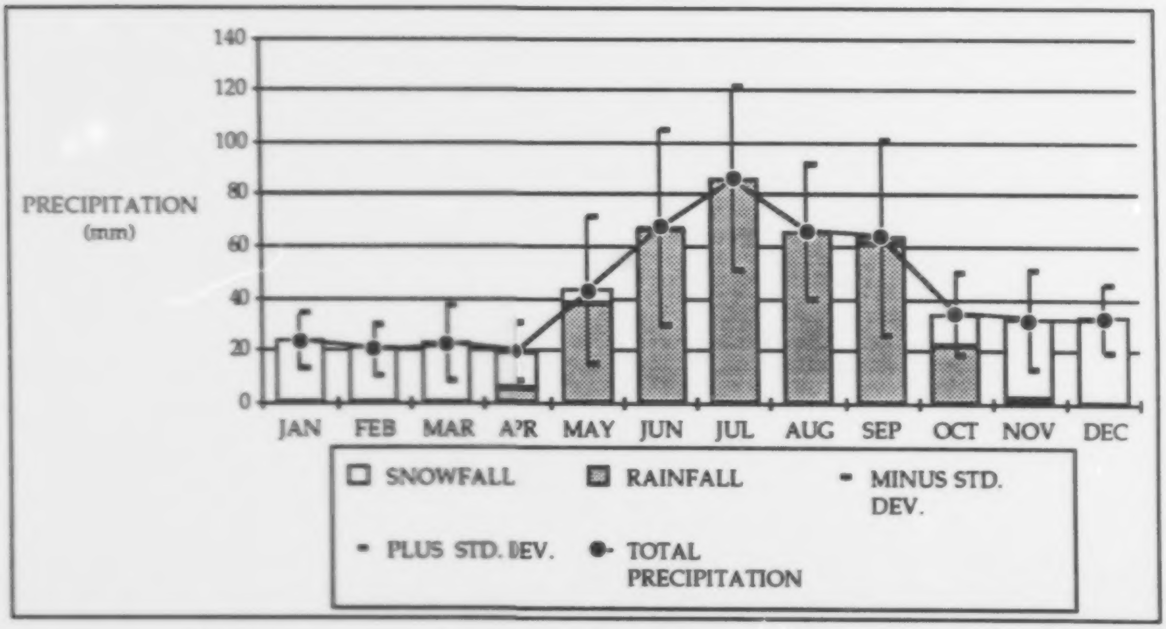

FIGURE C-24 PRECIPITATION FOR ISLAND FALLS

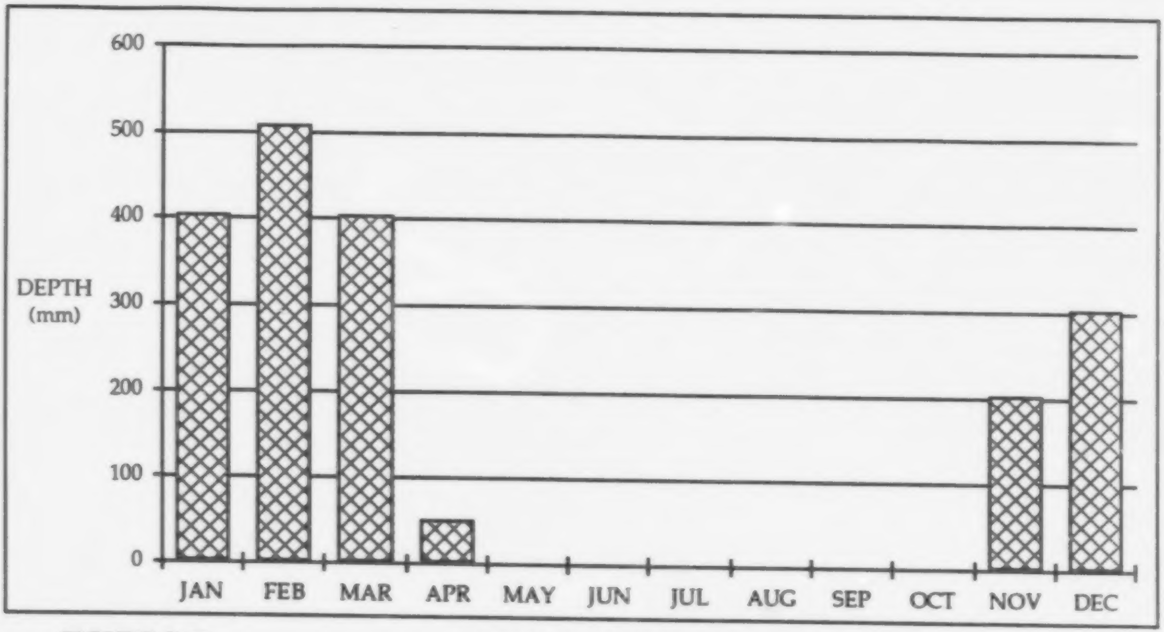

FIGURE C-25 MEDIAN SNOW DEPTH FOR ISLAND FALLS

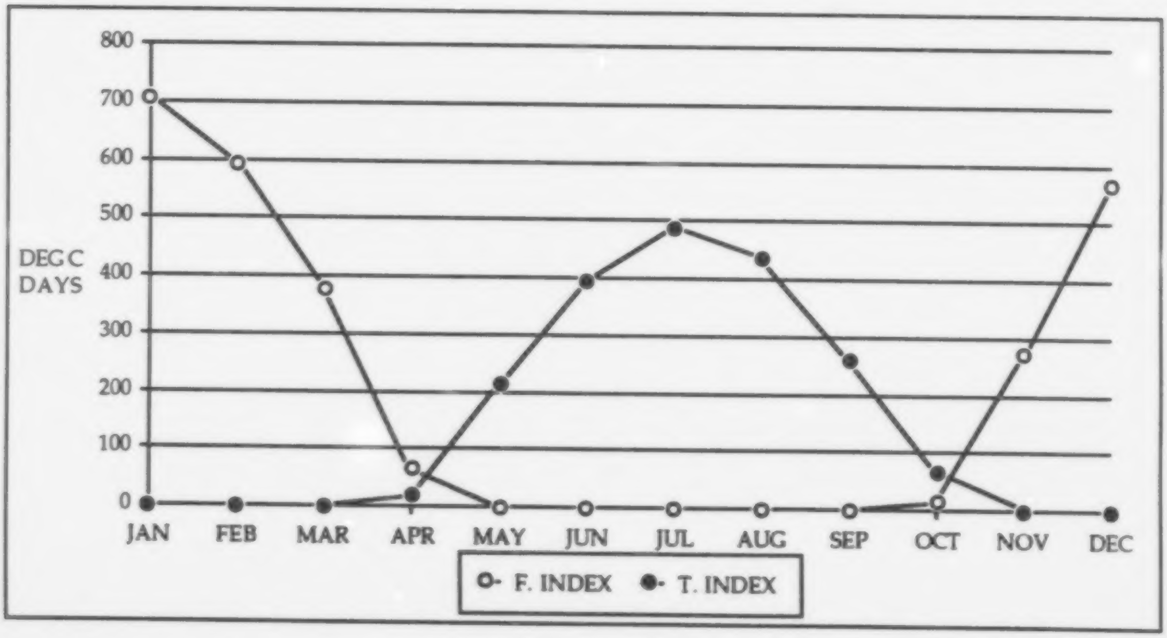

FIGURE C-26 FREEZING AND THAWING INDICES FOR ISLAND FALLS

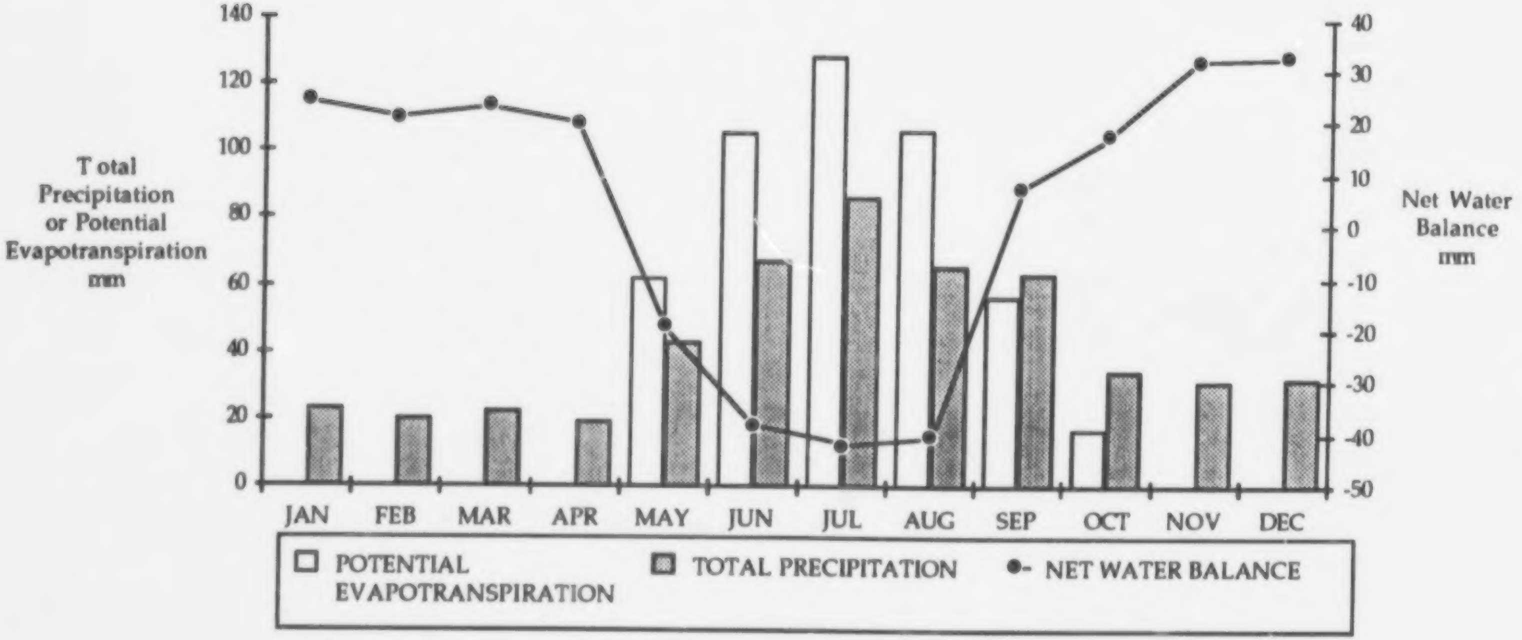

FIGURE C-27 POTENTIAL EVAPOTRANSPIRATION FOR ISLAND FALLS

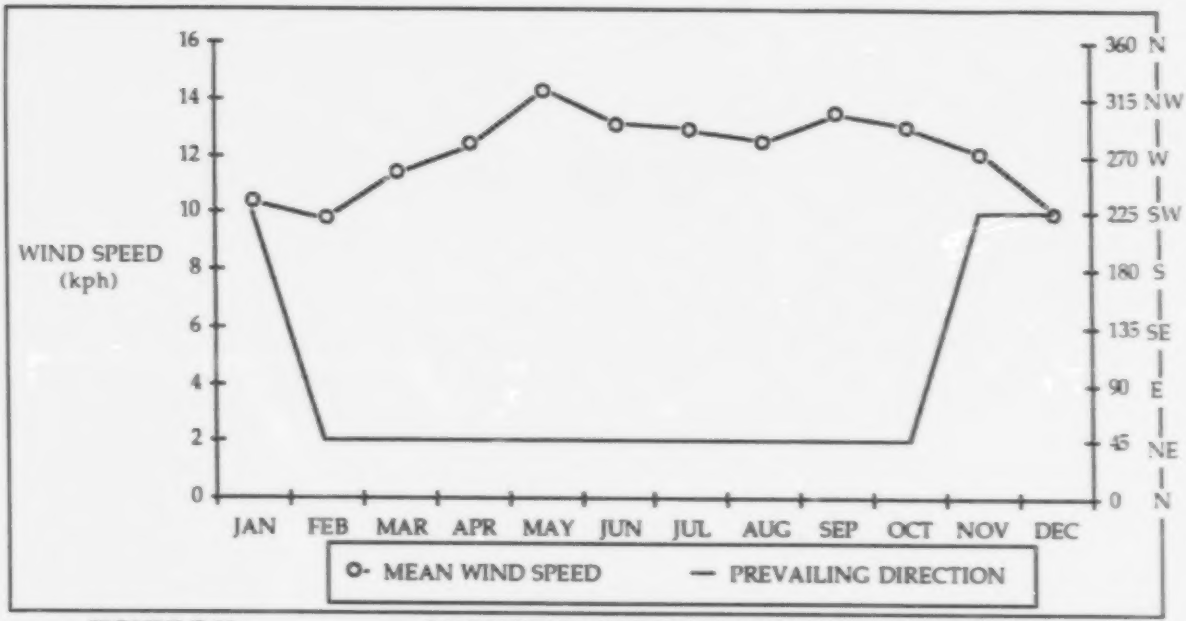

FIGURE C-28 MEAN WIND SPEED AND PREVAILING DIRECTION FOR ISLAND FALLS

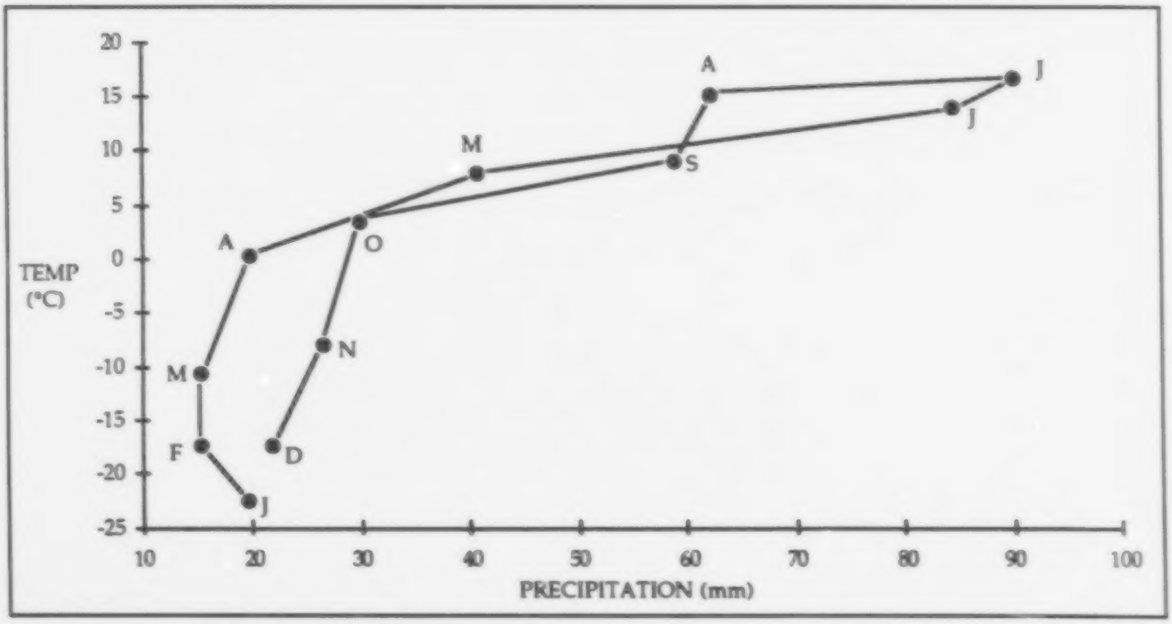

FIGURE C-29 HYTHERPLOT FOR LA RONGE

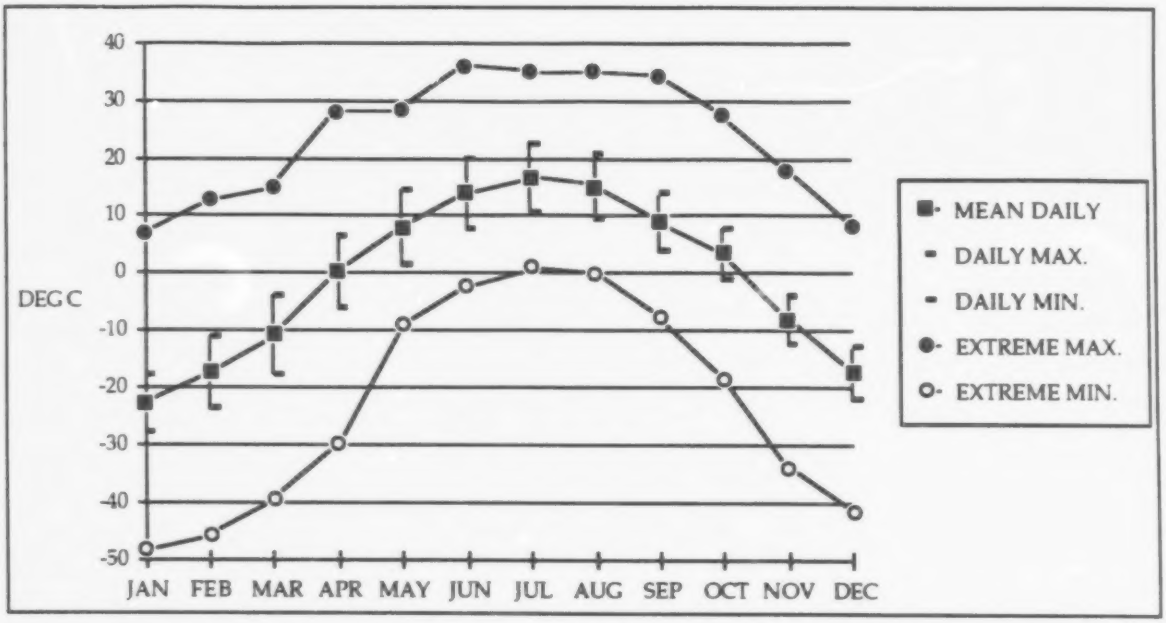

FIGURE C-30 **TEMPERATURE FOR LA RONGE**

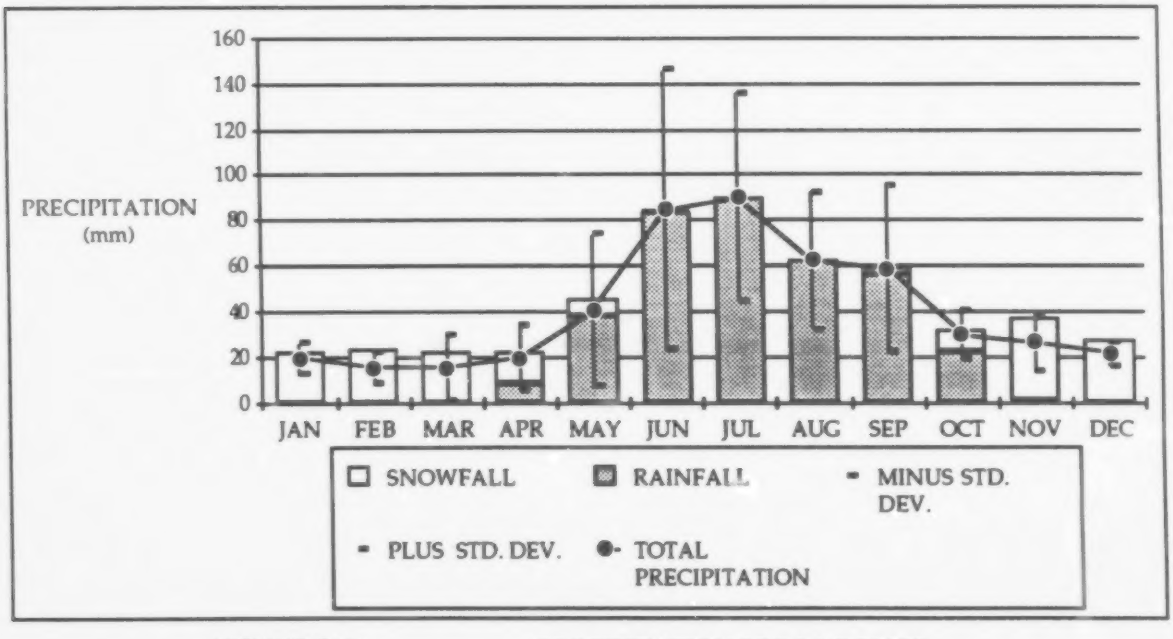

FIGURE C-31 **PRECIPITATION FOR LA RONGE**

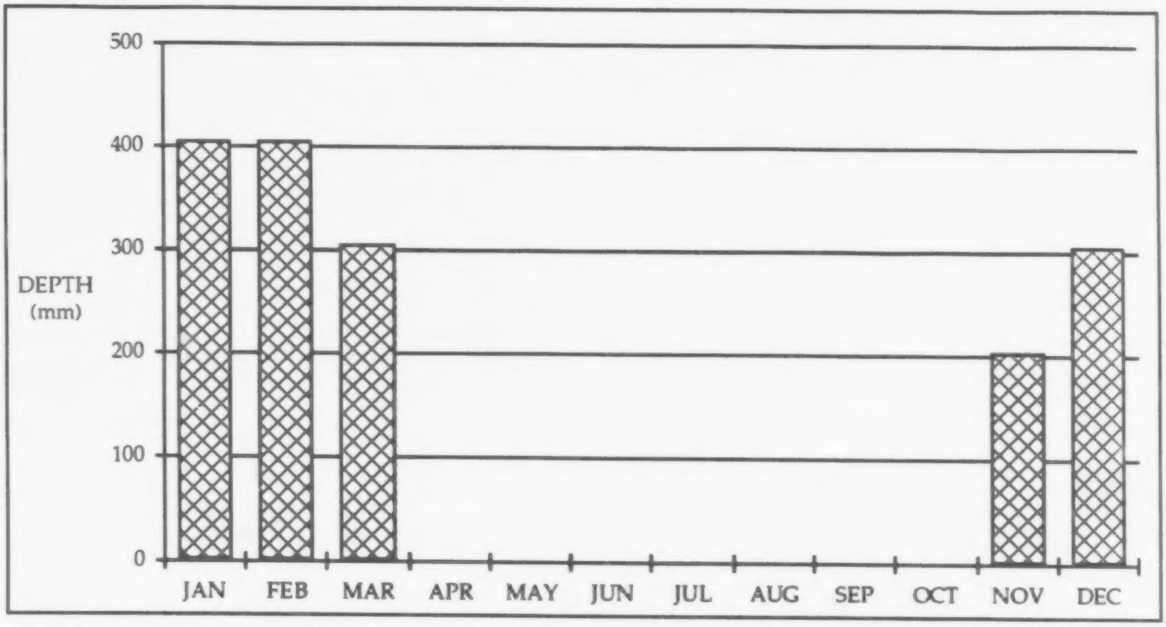

FIGURE C-32 MEDIAN SNOW DEPTH FOR LA RONGE

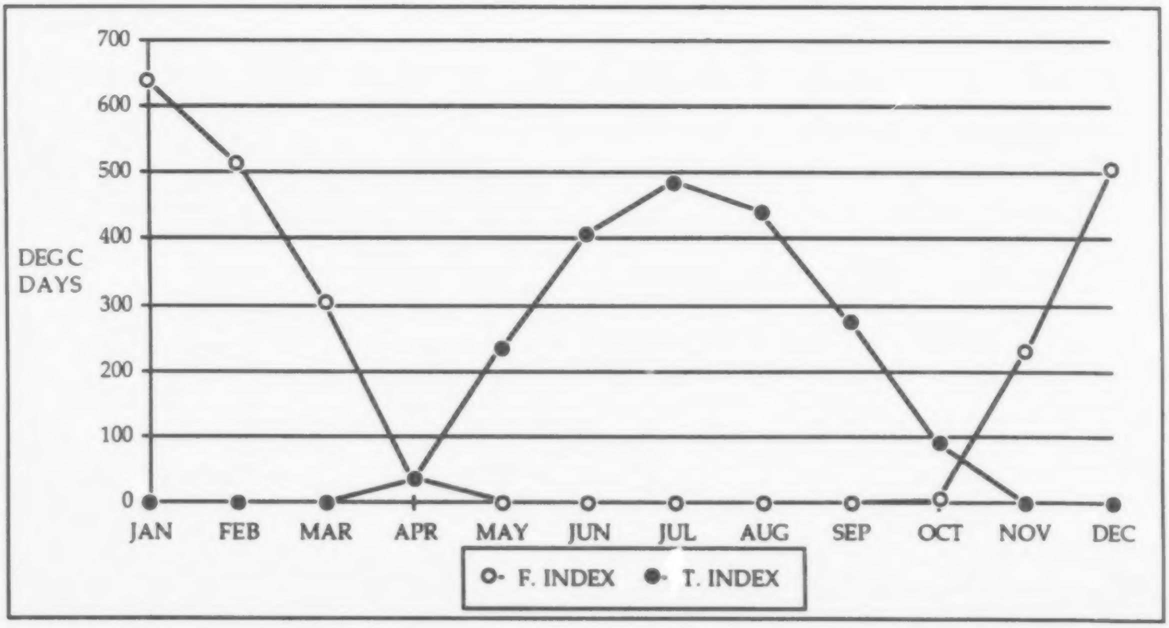

FIGURE C-33 FREEZING AND THAWING INDICES FOR LA RONGE

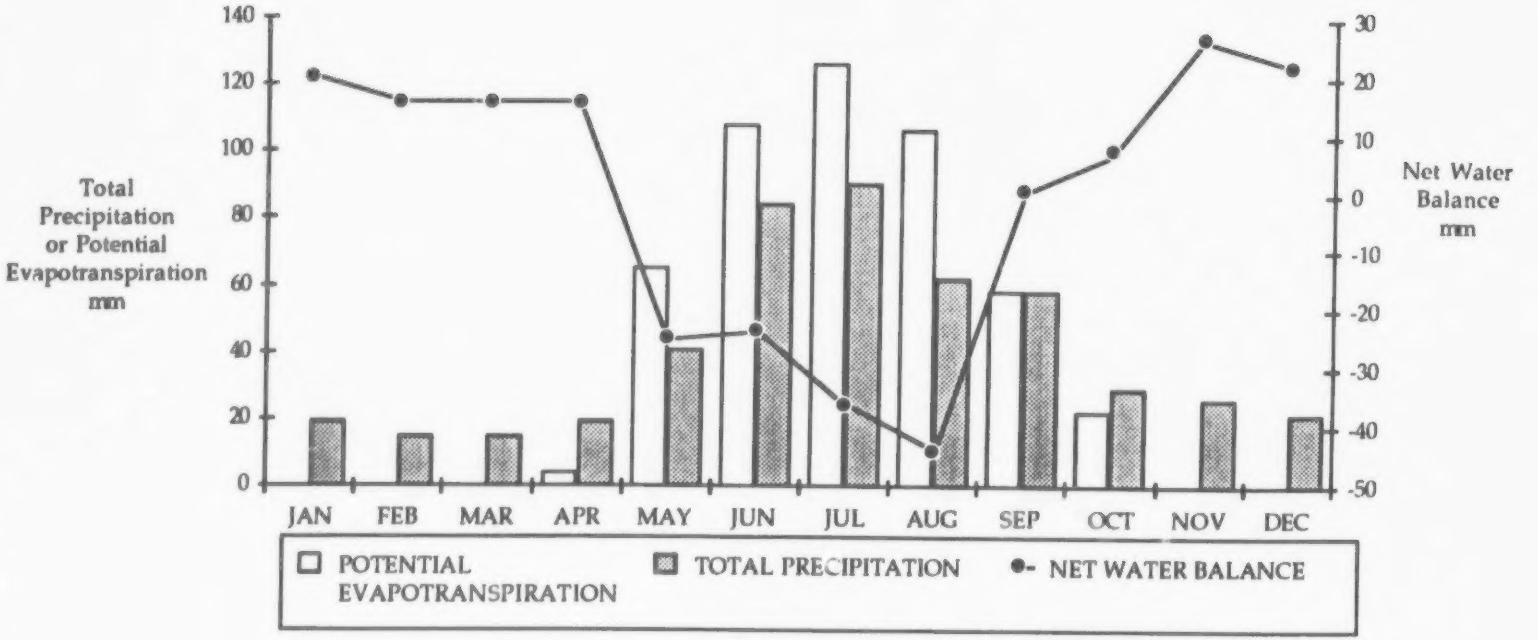

FIGURE C-34 POTENTIAL EVAPOTRANSPIRATION FOR LA RONGE

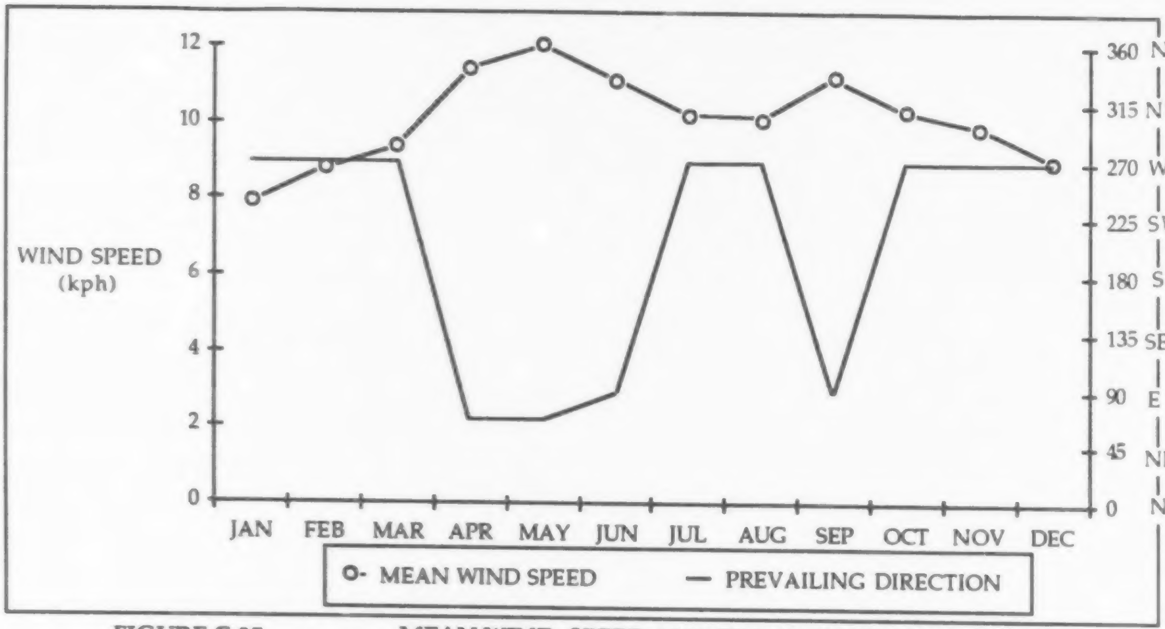

FIGURE C-35 MEAN WIND SPEED AND PREVAILING DIRECTION FOR LA RONGE

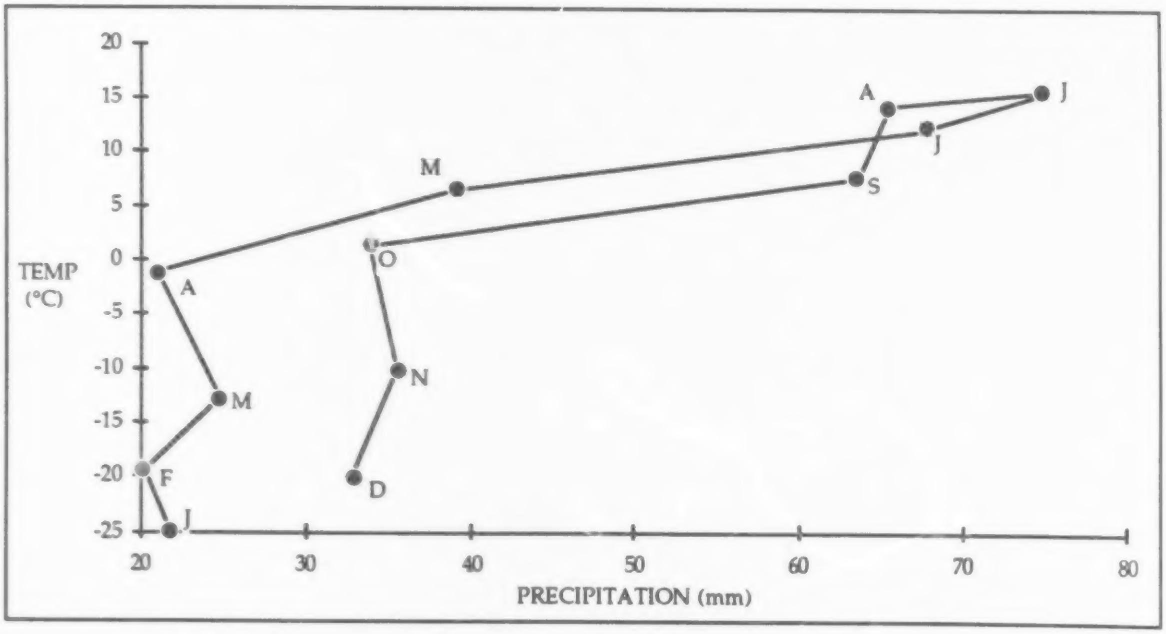

FIGURE C-36 HYTHERPLOT FOR WHITESAND DAM

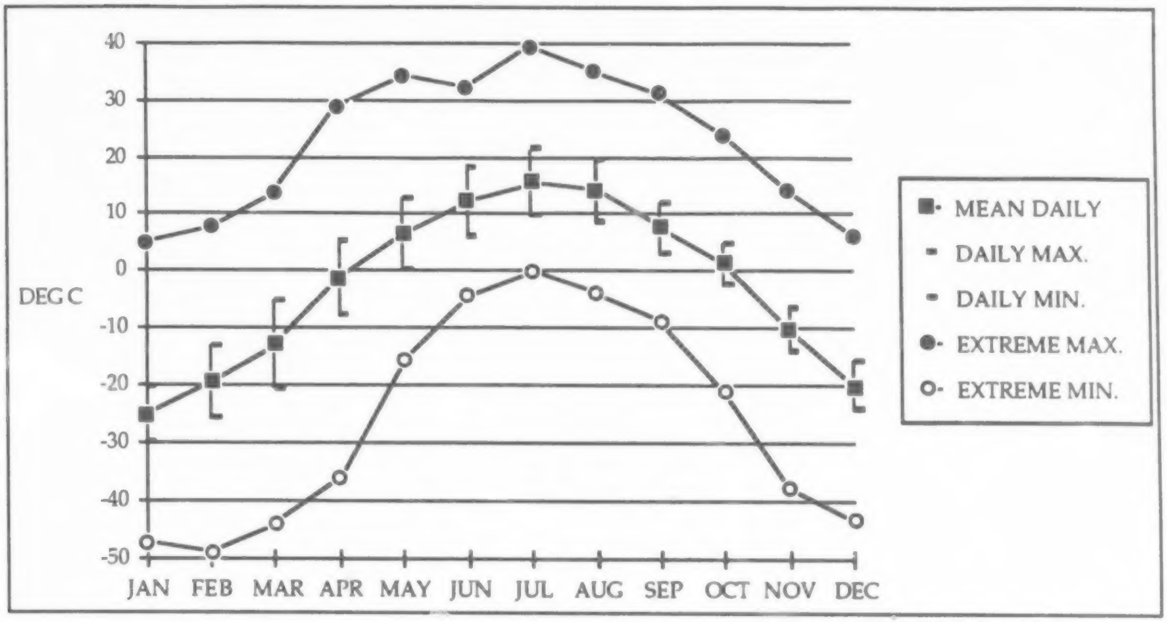

FIGURE C-37 **TEMPERATURE FOR WHITESAND DAM**

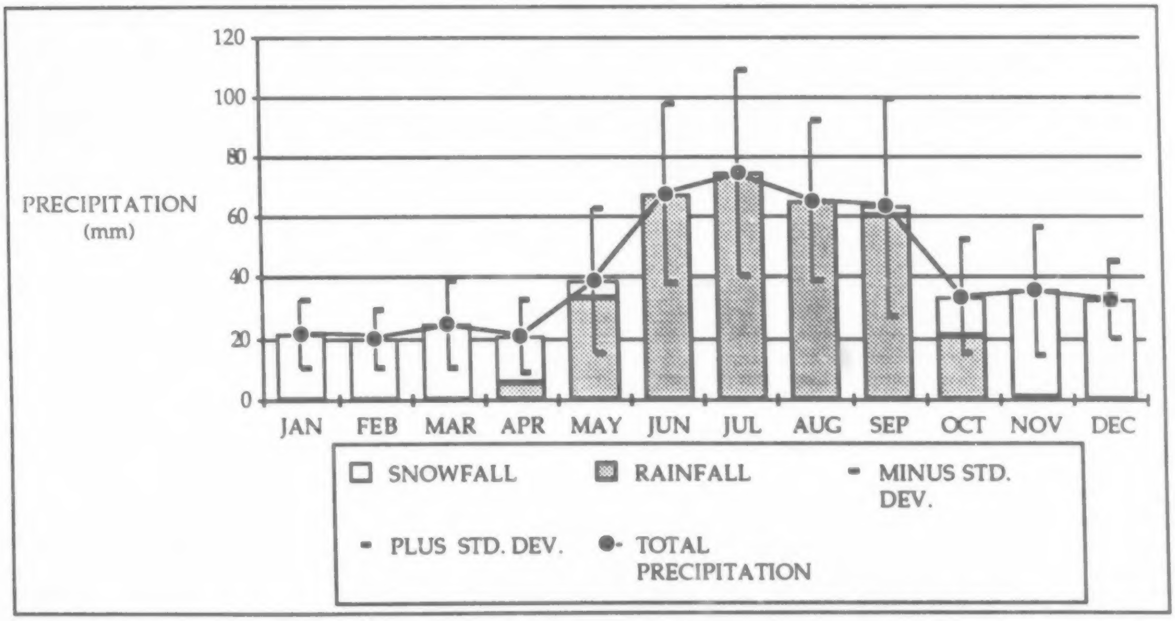

FIGURE C-38 **PRECIPITATION FOR WHITESAND DAM**

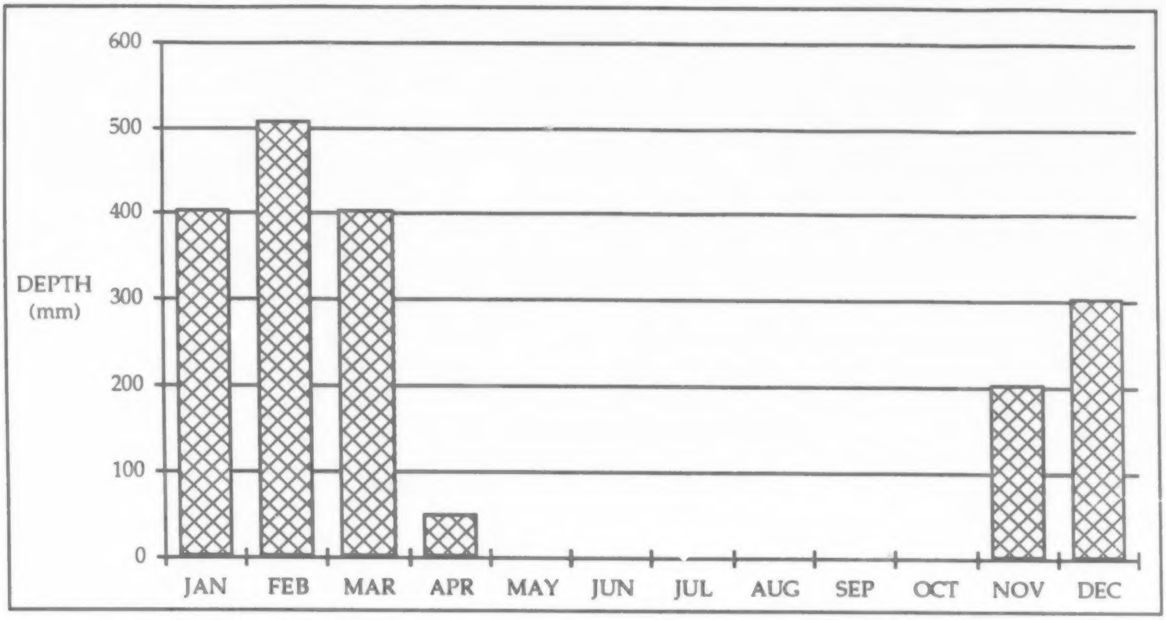

FIGURE C-39 MEDIAN SNOW DEPTH FOR WHITESAND DAM

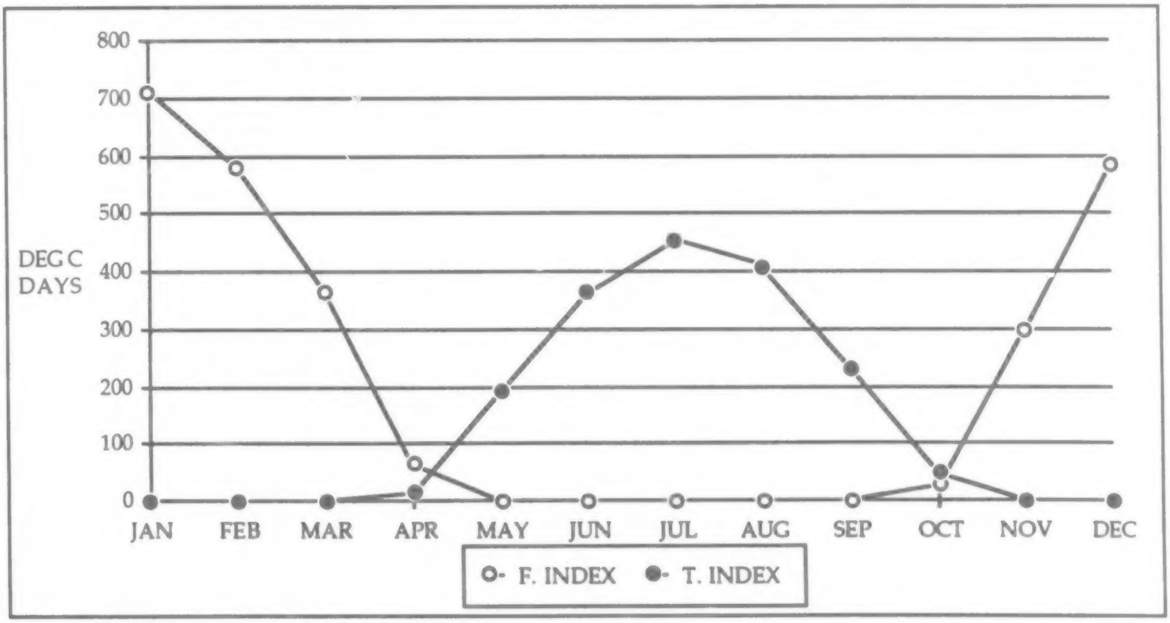

FIGURE C-40 FREEZING AND THAWING INDICES FOR WHITESAND DAM

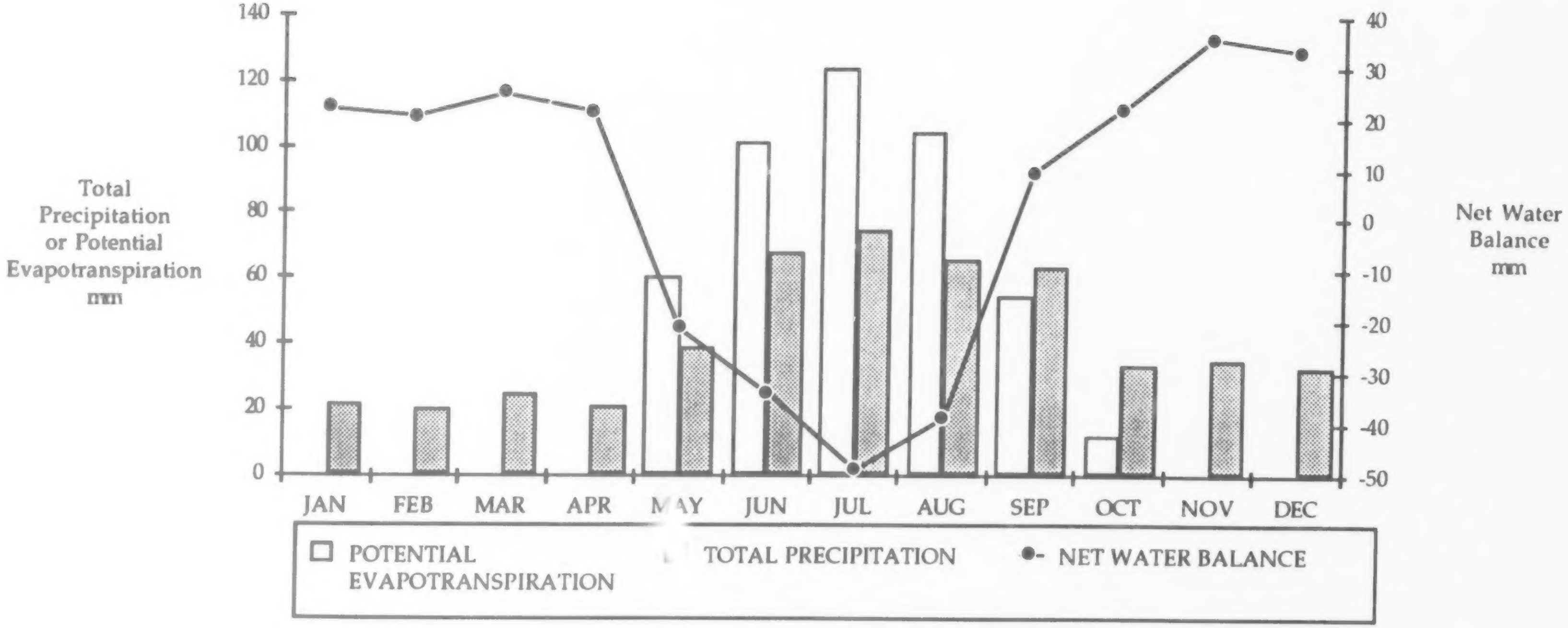

FIGURE C-41 POTENTIAL EVAPOTRANSPIRATION FOR WHITESAND DAM

SECTION D
VEGETATION

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APPENDIX D-1. TABLES

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1.0 INTRODUCTION

This section reviews available information on terrestrial vegetation found in the La Ronge Greenstone Belt. It includes a basic description of the plant community structure, a brief discussion on merchantable timber inventory estimates and a listing of rare and vascular plants known to occur in the area.

2.0 VEGETATION

2.1 Community Structure

The vegetation of the area falls into two main associations, lowlands and uplands. The species composition and community associations at any one site however, are largely determined by local environmental gradients of moisture, nutrients, and light.

2.1.1 Lowlands

The lowland land areas for the most part are composed of the fens and bogs.

Bogs are poorly drained sites which can vary from very wet, open, non-treed areas to moist depressions which support variable density stands of black spruce and tamarack. The understory is characterized by hummocks of sphagnum mosses with a layer of ericaceous shrubs, and interspersed with variable density stands of lichens. Common shrubs include mid-sized bog birches, labrador tea, leather-leaf, bog rosemary and pale laurel, and ground species including dry-ground cranberry, bog cranberry and crowberry. Associated herbs include cloudberry and three-leaved Solomon's-seal.

Fens are nutrient rich shoreline and inland meadow areas which are characterized by extensive sedge mats. The shoreline associations are similar to the inland fens in appearance but tend to have a higher density of bulrushes and rushes.

A variety of willows, bog birches and occasionally alders may be found in a narrow band around the periphery of both bogs and fens.

2.1.2 Uplands

Upland forest cover is largely determined by site moisture and soil conditions.

Black spruce forests are found on moderately well drained glacial soils. The dense canopy of spruce cuts out light for understory species, and the ground cover is a mat of mosses, predominantly *Pleurozium schreberi* and *Hylocomium splendens*. Some of the ericaceous shrubs of the spruce bog occur in places where there are openings in the forest canopy. A deciduous dominated association, represented by trembling aspen with some Alaska paper birch, occurs on moderately well drained glacial till. Green alder is the most common shrub although a number of other species including blueberry and bearberry are widely distributed throughout the region.

The rapidly drained, coarse tills and the rock outcrops of the shield are vegetated by open canopy jack pine stands. Blueberry and bearberry are the most common shrubs and the ground cover is largely composed of lichens of the genera *Cladina* and *Cladonia*. The rock outcrops have a characteristic flora which includes several species of ferns, some distinctive grasses (*Oryzopsis* and *Festuca* spp.) and three-toothed cinquefoil.

A list of vascular plant species for the Greenstone Belt (Table D-3) was extracted from a catalogue of herbarium specimens, with the addition of further material from references, in particular the Churchill River Study report (Heilman-Ternier and Harms 1975) and the Key Lake/Pinehouse Road investigations (Abouguendia and Godwin 1982). Rare plants were listed from Maher et al. (1979) and the catalogue of University of Saskatchewan herbarium specimens.

2.2 Forestry Resources

The forests of the La Ronge Greenstone Belt are divided by the southern and the northern boreal forest ecoregions (Harris et al. 1983).

2.2.1 The Southern Boreal Forest Ecoregion

The southern boreal forest ecoregion lies to the south of the Precambrian Shield. The area within the La Ronge Greenstone Belt is characterized by an undulating to rolling outwash plain and is dominated by mixed coniferous - deciduous forests. Jack pine is the dominant tree species with trembling aspen and black spruce next in abundance. Forest fires exert a significant influence on the vegetation. Fire-adapted species like aspen, pine and black spruce are far more common than older white spruce and balsam fir stands.

The general associations are given in Table D-1 and illustrated in Figure D-1.

2.2.2 Northern Boreal Forest Ecoregion

The majority of the Greenstone Belt lies within the Precambrian Shield and is referred to, for management purposes, as the northern boreal forest ecoregion. A variety of forest associations exist with jack pine being the most heterogeneously distributed species and black spruce the most abundant. Jack pine is most vigorous on the deeper, well-drained soils and least successful on shallow soils and rocky exposures. Black spruce may also persist on the shallow upland soils, but does best on deeper and moister substrate. White spruce and balsam fir prefer rich moist sites associated with river valleys or lake shorelines.

The Alaska paper birch is by far the most abundant hardwood within the northern boreal forest ecoregion; aspen generally being restricted to sites with favorable southern exposure.

Fire is the most influential factor modifying vegetation in the region. Most forest stands are of fire origin. Jack pine is the prevalent tree on warm and dry sites and black spruce on the moister sites; in the absence of fire, the trend is toward black spruce on all sites.

The general associations are given in Table D-2 and illustrated in Figure D-2.

3.0 FOREST INVENTORY

Saskatchewan Parks and Renewable Resources maintain an inventory of the province's forest resources. The inventory provides estimates of species wood volumes and distribution throughout the province. For the La Ronge Greenstone Belt, these estimates are based on three different mapping systems (Figure D-3).

3.1 Forest Inventory Maintenance (UTM) Series

The area to the south of the Churchill River is covered by a series of Universal Transmercator Grid (UTM) maps which cover 10 km X 10 km (10,000 hectares) each. Forest inventory data for these maps were compiled from aerial photographs taken in 1984.

3.2 Forest Inventory Maintenance (TOWNSHIP) Series

The inventory maps for a block of land centered on the Churchill River are each one township (approximately 11,000 ha) in size; townships are based on projections of survey lines from southern Saskatchewan. Data for this map series were compiled from 1966 aerial photographs.

3.3 Northern Reconnaissance

Inventory maps for the northern block each represent one quarter the area (22,000 ha) covered by a 1:50,000 scale National Topographic Series (NTS) map. This inventory information was compiled from aerial photographs taken in 1971.

Species totals for wood volumes and area estimates of productive timber lands are presented for each inventory block (Map D). Additional data are also provided for the proportion of trees of each species over 22 cm in diameter (Map D). In general, the rate of growth of the trees decreases as one goes north, and thus, the viability of commercial forest operations also decreases. This quality of information is available for each individual map sheet, or by special order for smaller or irregularly shaped areas.

4.0 RARE VASCULAR PLANT SPECIES

This section includes a listing of all known rare plants in the La Ronge Greenstone Belt. This list relies heavily on Maher et al. (1979), supplemented by a search of the W.P. Fraser herbarium at the University of Saskatchewan. Maher et al. (1979) define rare plants as one that has a small population within the province. It may be restricted to a small geographical area, or it may occur sparsely over a wider area. Some plants may be classed as rare in Saskatchewan in relation to their occurrence in the province, but may be widespread elsewhere.

SPARGANIACEAE

Sparganium fluctuans (Morong.) Robins. Listed as a rare spaecies in Saskatchewan (Maher et al. 1979).

NAJADACEAE

Potamogeton epihydrus Raf. Ribbon-leaved Pondweed. Only other known location is at Amisk Lake.

P. obtusifolius Mert. & Koch. Blunt-leaved Pondweed. Found elsewhere in the province only at Lake Athabasca.

P. robbinsii Oakes. Robbin's Pondweed.

SCHEUCHZERIACEAE

Scheuchzeria palustris L. var. **americana** Fern. Scheuchzeria. Found to be a dominant species in fens in the Key Lake area, but rare elsewhere.

GRAMINAE

Agropyron trachycaulum (Link.) Malte. var. **glaucum** (Pease & Moore). Glaucous Wheatgrass.

Arctagrostis latifolia (R.Br.) Griseb. var. **latifolia.** Polar Grass. Only one other collection in Saskatchewan.

Festuca brachyphylla Schult. Alpine or Short-leaved Fescue. Known only from Windrum Lake.

Panicum lanuginosum Ell. var. **implicatum** (Scribn.) Fern. Panic Grass. Known from about three other locations in Saskatchewan.

Poa lanata Scribn. & Merr. Lanate Bluegrass. Known otherwise only from Lake Athabasca within Saskatchewan.

P. nemoralis L. Woodland Bluegrass.

Scolochloa festucacea (Willd.) Link. Spangletop. A southern species found only rarely in the northern part of the province.

Torreyochloa pallida (Torr.) Church var. **fernaldii** (Hitchc.) Dore. Pale Manna Grass. Known from about four areas in the province.

CYPERACEAE

Carex adusta Boott. Browned Sedge.

C. **atratiformis** Britt. ssp. **raymondii** (Calder) Porsild. Blackish Sedge.

C. **echinata** Murray. Prickly Sedge. New for the province west of Numabin Bay.

C. **flava** L. Yellow sedge. One confirmed record for the province from Mallard Lake.

C. **garberi** Fern. Garber's Sedge. Only about eight known locations for the province.

C. **interior** Bailey. Inland Sedge.

C. **lenticularis** Michx. Lens-shaped Sedge.

C. **michauxiana** Boeckl. Tufted Sedge. Second Saskatchewan record found in this area.

C. **oligosperma** Michx. Few-seeded Sedge.

C. **pauciflora** Lightf. Few-flowered Sedge.

C. **trisperma** Dew. Three-fruited Sedge.

Eriophorum scheuchzeri Hoppe. Scheuchzer's Cottongrass. A northern species, rare here.

Rhyncospora alba (L.) Vahl. White-beaked Rush. Known only from Windrum L.

Scirpus hudsonianus (Michx.) Fern. Hudson Bay Bulrush. Rare here, but fairly common in the northern transition zone.

JUNCACEAE

Juncus stygius L. ssp. **americanus** (Buchenau) Hult. American Bog Rush.

Luzula parviflora (Ehrh.) Desv. Small-flowered Woodrush.

ORCHIDACEAE

Calypso bulbosa (L.) Oakes. Venus' Slipper Orchid.

Cypripedium acaule Ait. Stemless Lady's-slipper.

Listera cordata (L.) R. Br. Heart-leaved Twayblade.

Malaxis paludosa (L.) Sw. Bog Adder's-mouth.

Spiranthes lacera Raf. =? **Spiranthes gracilis** (Bigel.) Beck. Slender Ladies' Tresses.

SALICACEAE

Salix vestita Pursh. Rock Willow. Only two other locations known for the province apart from the northern transition zone where it is fairly common.

POLYGONACEAE
Polygonum erectum L. Erect Knotweed.

CARYOPHYLLACEAE
Arenaria macrophylla Hook. Large-leaved Sandwort. About four other known locations in the province.

NYMPHACEAE
Nymphaea tetragona Georgi. Small White Water Lily.

RANUNCULACEAE
Caltha natans Pall. Floating Marsh Marigold.

CRUCIFERAE
Cardamine parviflora L. var. **arenicola** Britt. Small-flowered Sand Bitter Cress.

Subularia aquatica L. Awlwort. About three other known locations in the province.

SAXIFRAGACEAE
Saxifraga bronchialis L. Spotted Saxifrage.

LEGUMINOSAE
Astragalus alpinus L. Alpine Milk-vetch. One other known record in the province.

EMPETRACEAE
Empetrum nigrum L. Crowberry. Rare in this part of the province although common farther north.

HYPERICACEAE
Hypericum majus (A. Gray) Britt. Larger St. John's-wort.
H. mutilum L. St. John's-wort.

VIOLACEAE
Viola palustris L. Marsh Violet. Previously there were about six known locations in the province, but this violet is more common throughout its range in this province than once thought.

HALORAGACEAE
Myriophyllum alterniflorum DC. Listed as rare in Saskatchewan.
M. verticillatum L. var. **pectinatum** Walk. Whorled Water-Milfoil. About five other known locations in the province.

PYROLACEAE

Chimaphila umbellata (L.) Bart. ssp. **occidentalis** (Rydb.) Hult. Prince's Pine. Locations scattered and unpredictable.

SCROPHULARIACEAE

Castilleja miniata Dougl. Red Indian Paintbrush.

Euphrasia arctica Lange var. **arctica**. Eyebright. About three other known records in the northern areas of the province.

LENTIBULARIACEAE

Utricularia minor L. Lesser Bladderwort. About 10 known locations.

COMPOSITAE

Bidens beckii Torr. Beggar-ticks.

Erigeron acris L. var. **asteroides** (Andrz.) Bess. Fleabane.

Erigeron hyssopifolius Michs. Fleabane.

Helenium autumnale L. Sneezeweed.

Senecio streptanthifolius Greene. Northern Groundsel. About three other known locations.

5.0 BIBLIOGRAPHY

Abouguendia, Z.M. and R.C. Godwin. 1982. Botanical investigations along the Pinehouse - Key Lake Road, North-central Saskatchewan. Musk-ox 31:17-49.

Argus, G.W. 1968. Contributions to the flora of boreal Saskatchewan. Rhodora 70:200-214.

Boivin, B. 1967. Flora of the Prairie Provinces, Part I - Pteroids, Ferns, Conifers and Woody Dicopsids. (Reprinted from Phytologia 15 & 16). 202 pp.

Caldwell, R. 1960. A new pondweed for Saskatchewan. Blue Jay 18(3): 129.

Harris, W.C., A. Kabzems, A.L. Kosowan, G.A. Padbury and J.S. Rowe. 1983. Ecological Regions of Saskatchewan. Saskatchewan Parks and Renewable Resources. Tech. Report No. 10. Forestry Branch, Prince Albert.

Harms, V.L., J.H. Hudson and J. Heilman-Ternier. 1980. Contributions to the vascular flora of boreal Saskatchewan, Canada. Rhodora 82:239-280.

Heilman-Ternier, J. and V.L. Harms. 1975. Churchill River Study. Plant Ecology - Taxonomy.

Hudson, J.H. 1984. A second evening star in Saskatchewan. Blue Jay 42(1):20-21.

Maher, R.V., G.W. Argus, V.L. Harms and John J. Hudson. 1979. The rare vascular plants of Saskatchewan. National Museum of Canada Syllogeus No. 20.

6.0 DATA SOURCES AND CONTACTS

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APPENDIX D-1. TABLES

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Table D-1. Forest variations on undulating outwash plains of the La Ronge Greenstone Belt.

Local Climate	Soil Order	Drainage	Vegetation
Dry-Warm	Brunisolic	Rapidly drained	Jack Pine/Lichen
Normal	Brunisolic	Well drained	Jack Pine-Black Spruce-Aspen/Bearberry-Blueberry
Wet-Cool	Luvisolic	Imperfectly drained	Black Spruce/ Feather Moss
Wet-Cool	Organic	Poorly to very poorly drained	Black Spruce-Tamarack/Peat Moss

Table D-2. Forest variation on glacial till over bedrock for the La Ronge Greenstone Belt.

Local Climate	Soil Order	Drainage	Vegetation
Dry-Warm	Brunisolic	Rapidly drained	Jack Pine-Black Spruce/Lichen
Normal	Brunisolic	Well drained	Jack Pine-Black Spruce/Feather Moss
Wet-Cool	Luvisolic	Imperfectly	Black Spruce/ Feather Moss
Wet-Cool	Organic	Poorly to very poorly drained	Black Spruce-Tamarack/Peat Moss

Table D-3. Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous wS,bS/jP	Upland Deciduous MW	 tA	Bog Forest	Marsh Fen	 Shore	Aquatic Shore	 H2O	Disturbed	Rock Outcrop
LYCOPODIACEAE										
Lycopodium annotinum L.	+	+	+							
Stiff Club-moss										
L. clavatum L.	+	+	+							
Running Club-moss										
L. complanatum L. Ground Cedar	+	+	+							
L. inundatum L.				+						
Bog or Marsh Club-moss										
L. obscurum L. var. **dendroideum**	+		+							
(Michx.) D.C. Eaton. Ground Pine										
L. selago L. Mountain Club-moss	+			+						
SELAGINELLACEAE										
Selaginella densa Rydb.										+
Little Club-moss										
S. rupestris (L.) Spreng										+
Rock Selaginella										
ISOETACEAE										
Isoetes muricata Dur. var. **braunii**								+		
(Engelm.) Reed. Quillwort										
EQUISETACEAE										
Equisetum arvense L.	+	+	+	+			+		+	
Common Horsetail										
E. fluviatile L. Swamp Horsetail					+	+				
E. pratense Ehrh.		+	+				+			
Meadow Horsetail										
E. scirpoides Michx.	+			+						
Dwarf Scouring Rush										
E. sylvaticum L.	+	+	+				+		+	
Woodland Horsetail										
OPHIOGLOSSACEAE										
Botrychium lunaria (L.) Sw.	+	+	+							
Moonwort										
B. matricariifolium A. Br. var.										
matricariifolium										+
Chamomile-leaved Grape-fern										
B. multifidum (Gmel.) Rupr.							+			
Leathery Grape-fern										
POLYPODIACEAE										
Athyrium filix-femina (L.) Roth.							+			
Lady Fern										

Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous		Upland Deciduous		Bog Forest	Marsh		Aquatic		Disturbed	Rock Outcrop
	wS,bS	jP	MW	tA		Fen	Shore	Shore	H20		
Cryptogramma crispa (L.) R. Br. ssp. **acrostichoides** (R. Br.) Hulten. American Rock-fern											+
Cystopteris fragilis (L.) Bernh. Fragile Fern								+			+
Dryopteris austriaca (Jacqu.) Woynar. Spinulose Shield-fern			+	+							
D. fragrans (L.) Schott. Fragrant Shield-fern											+
D. spinulosa (O.F. Mueller)Watt. Spinulose Shield-fern											+
Gymnocarpium dryopteris (L.) Newm. Oak Fern											+
G. robertianum (Hoffm.)Newm. Scented Oak Fern											+
Matteucia struthiopteris (L.) Todaro var. **pensylvanica** (Willd.) Morton. Ostrich Fern								+			
Polypodium vulgare L. var. **virginianum** (L.) Eaton Common Polypody											+
Thelypteris phegopteris (L.) Slosson Beech Fern							+	+			
Woodsia ilvensis (L.) R. Br. Rusty Woodsia											+
PINACEAE											
Abies balsamea (L.) Mill. Balsam Fir	+										
Larix laricina (Du Roi) K. Koch. Tamarack, Larch					+						
Picea glauca (Moench.) Voss. White Spruce	+		+								
P. mariana (Mill.) B.S.P. Black Spruce	+		+		+						
Pinus banksiana Lamb. Jack Pine		+	+								+
CUPRESSACEAE											
Juniperus communis L. Low Juniper		+	+	+							+
TYPHACEAE											
Typha latifolia L. Common Cattail						+	+	+	+		
SPARGANIACEAE											
Sparganium angustifolium Michx. Narrow-leaved Burreed									+		
S. chlorocarpum Rydb. Green-fruited Burreed									+		

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Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous	Upland Deciduous		Bog Forest	Marsh		Aquatic		Disturbed	Rock Outcrop
	wS,bS/jP	MW	tA		Fen	Shore	Shore	H2O		
S. eurycarpum Engelm. Giant Burreed								+		
S. fluctuans (Morong) B.L. Robinson								+		
S. minimum (Hartm.) Fries. Small Burreed								+		
S. multipedunculatum (Morong) Rydb. Many-stalked Burreed								+		
NAJADACEAE										
Potamogeton alpinus Balbis var. **tenuifolius** (Raf.) Ogden Northern Pondweed					+			+		
P. amplifolius Tuckerm. Large-leaved Pondweed								+		
P. epihydrus Raf. Ribbon-leaved Pondweed					+	+		+		
P. filiformis Pers. Thread-leaved Pondweed								+		
P. friesii Rupr. Fries' Pondweed								+		
P. gramineus L. Grass-leaved Pondweed					+	+		+		
P. natans L. Common Floating Pondweed						+	+			
P. obtusifolius Mert. & Koch. Blunt-leaved Pondweed					+					
P. pectinatus L. Fennel-leaved Pondweed								+		
P. praelongus Wulf. White-stemmed Pondweed								+		
P. pusillus L. Small Pondweed					+	+				
P. richardsonii (Benn.) Rydb. Clasping-leaved Pondweed								+		
P. robbinsii Oakes. Robbin's Pondweed								+		
P. zosteriformis Fern. Eelgrass-like Pond weed				+	+	+		+		
SCHEUCHZERIACEAE										
Scheuchzeria palustris L. var. **americana** Fern. Scheuchzeria.					+		+			
Triglochin maritima L. Sea-side Arrow-grass				+	+	+				
ALISMACEAE										
Sagitaria cuneata Sheldon Arum-leaved Arrowhead					+	+	+	+		
GRAMINAE										

Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous wS,bS	 Upland Coniferous jP	Upland Deciduous MW	Upland Deciduous tA	Bog Forest	Marsh Fen	Marsh Shore	Aquatic Shore/H20	Disturbed	Rock Outcrop
Agropyron dasystachyum (Hook.) Scribn. var. **dasystachyum.** Northern Wheatgrass			+	+						
A. repens (L.) Beauv. var. **repens** Couch Grass, Quack Grass									+	
A. trachycaulum (Link.) Malte. var. **trachycaulum.** Western Wheat Grass			+	+				+	+	+
A. trachycaulum (Link.) Malte. var. **glaucum** (Pease & Moore) Glaucous Wheatgrass			+	+						
A. t. var. **novae-angliae** (Scribn.) Fern. New England Wheatgrass										+
Agrostis scabra Willd. Rough Hair-grass, Tickle Grass	+	+	+	+					+	+
Alopecurus aequalis Sobol. Short-awned or Water Foxtail						+	+	+	+	
Arctagrostis latifolia (R.Br.) Griseb. var. **latifolia.** Polar Grass						+				
Beckmannia syzigachne (Steud.) Fern. Slough Grass						+	+	+	+	
Bromus ciliatus L. (s.lat.) Fringed Brome			+	+						
B. inermis Leyss. Smooth Brome									+	
B. pumpellianus Scribn. Northern Brome			+	+					+	
Calamagrostis canadensis (Michx.) Beauv. Bluejoint	+		+	+		+	+	+		
C. c. var. **robusta** Vasey. Robust Bluejoint						+	+	+		
C. inexpansa A. Gray Northern Reed Grass						+	+	+		
C. lapponica (Wahl.) Hartm. Lapland Reed Grass					+	+	+		+	
C. neglecta (Ehrh.) Gaertn., Mey & Scherb. Narrow Reed Grass			+	+		+	+	+		+
Cinna latifolia (Trev.) Griseb. Slender Wood Grass					+				+	
Danthonia spicata (L.) Beauv. Poverty Oat-grass										+
Deschampsia caespitosa (L.) Beauv. Tufted Hair-grass								+		
Elymus innovatus Beal. Hairy Wild Rye		+	+	+					+	+

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Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous wS,bS/jP	Upland Deciduous MW	 tA	Bog Forest	Marsh Fen	 Shore	Aquatic Shore	 H2O	Disturbed	Rock Outcrop
Festuca brachyphylla Schult. Alpine or Short-leaved Fescue										+
F. saximontana Rydb. Rocky Mountain Fescue							+			+
Glyceria borealis (Nash) Batch. Northern Manna Grass					+	+				
G. grandis S.Wats. Tall Manna Grass					+	+	+			
G. striata (Lam.) Hitchc. Fowl Manna Grass							+	+		
Hierochloe odorata (L.) Beauv. Sweet Grass	+	+	+				+			
Hordeum jubatum L. Wild or Squirrel-tail Barley									+	
Oryzopsis asperifolia Michx. White-grained Mountain Rice			+							
O. pungens (Torr.) Hitchc. Slender Mountain Rice	+	+	+							
Panicum capillare L. var. **occidentale** Rydb. Witch Grass									+	
P. lanuginosum Ell. var. **implicatum** (Scribn.) Fern Tangled Wool Panic Grass									+	+
Phalaris arundinacea L. Reed Canary Grass						+	+			
Phleum pratense L. Timothy									+	
Phragmites communis Trin. Reed Grass						+				
Poa alpigena (Fr.) Lindm. Alpine Bluegrass							+		+	
P. annua L. Annual Bluegrass									+	
P. glauca Vahl. Glaucous Bluegrass	+		+				+		+	+
P. interior Rydb. Inland Bluegrass		+	+						+	+
P. lanata Scribn. & Merr. Lanate Bluegrass							+			
P. nemoralis L. Woodland Bluegrass							+			
P. palustris L. Marsh Bluegrass							+		+	
P. pratensis L. Kentucky Bluegrass							+		+	
Schizachne purpurasacens (Torr.) Swallen. Purple Oatgrass	+	+	+				+			

Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous wS,bS	 jP	Upland Deciduous MW	 tA	Bog Forest	Marsh Fen	 Shore	Aquatic Shore	 H2O	Disturbed	Rock Outcrop
Scolochloa festucacea (Willd.) Link. Spangletop						+					
Secale cereale L. Rye.										+	
Torreyochloa pallida (Torr.) Church var. **fernaldii** (Hitchc.) Dore. Pale Manna Grass						+	+	+			
CYPERACEAE											
Carex abdita Bickn. Hidden Sedge		+		+							+
C. adusta Boott. Browned Sedge										+	
C. aenea Fern. Hay Sedge		+								+	+
C. aquatilis Wahl. Water Sedge						+	+	+			
C. atherodes Spreng. Awned Sedge						+	+	+			
C. atratiformis Britt. ssp. **raymondii** (Calder) Porsild. Blackish Sedge								+			
C. aurea Nutt. Golden Sedge					+	+		+			
C. brunnescens (Pers)Poir. Brownish Sedge		+				+	+				+
C. canescens L. Hoary Sedge					+	+	+	+			
C. chordorrhiza L. f. Prostrate-stemmed Sedge					+	+					
C. crawfordii Fern. Crawford's Sedge								+		+	
C. deflexa Hornem. Deflexed Sedge	+	+	+	+							+
C. diandra Schrank. Two-stamened Sedge						+	+				
C. disperma Dewey. Soft-leaved Sedge					+	+	+	+			
C. echinata Murray. Prickly Sedge					+						
C. garberi Fern. Garber's Sedge										+	
C. gynocrates Wormsk. Northern Bog Sedge						+					
C. flava L.								+			
C. houghtonii Torr. Houghton's Sedge		+								+	+
C. interior Bailey. Inland Sedge					+	+					
C. lacustris Willd. Lakebank Sedge						+	+				
C. lasiocarpa Ehrh. Hairy-fruited Sedge						+	+	+			
C. lenticularis Michx. Lens-shaped Sedge								+			
C. leptalea Wahl. Bristle-stalked Sedge										+	
C. limosa L. Mud Sedge						+					

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Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous		Upland Deciduous		Bog Forest	Marsh		Aquatic		Disturbed	Rock Outcrop
	wS,bS	jP	MW	tA		Fen	Shore	Shore	H20		
C. livida (Wahl.) Willd Pale Lead-colored Sedge						+	+				
C. loliacea L. Rye-like or Beakless Sedge					+		+	+			
C. magellanica Lam. Bog Sedge					+	+			+		
C. michauxiana Boeckl. Tufted Sedge							+				
C. muricata L. Sedge								+			
C. norvegica Retz. Alpine Sedge					+	+		+			
C. oligosperma Michx. Few-seeded Sedge					+	+					
C. pauciflora Lightf. Few-flowered Sedge					+	+					
C. peckii Howe. Sedge		+		+							
C. praticola Rydb. Northern Meadow Sedge	+	+	+	+							
C. retrorsa Schwein. Reflexed-fruit Sedge								+			
C. richardsonii R. Br. Richardson's Sedge				+							
C. rostrata Stokes. Beaked Sedge						+	+	+			
C. siccata Dewey (C. foena Willd.) Dry-spiked Sedge				+				+			+
C. stipata Muhl. Awl-fruited Sedge			+								
C. tenera Dewey. Straw Sedge								+			
C. tenuiflora Wahl. Sparse-flowered Sedge					+						
C. trisperma Dew. Three-fruited Sedge					+						
C. vaginata Tausch. Sheathed Sedge	+				+	+					
Eleocharis acicularis (L.) Roem. & Schult. var. **acicularis.** Needle Spike-rush						+	+	+			
E. palustris (L.) R. & S. Creeping Spike Rush						+	+	+	+		
Eriophorum angustifolium Honck. Tall or Narrow-leaved Cottongrass					+	+					
E. brachyantherum Trautv. Close-sheathed Cottongrass					+	+					
E. chamissonis C.A. Mey. Chamisso's Cottongrass						+					

Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous	Upland Deciduous		Bog Forest	Marsh		Aquatic		Disturbed	Rock Outcrop
	wS,bS/jP	MW	tA		Fen/Shore		Shore/H2O			
E. gracile Koch.				+	+					
Slender Cottongrass										
E. scheuchzeri Hoppe.					+					
Scheuchzer's Cottongrass										
E. vaginatum L. ssp. **spissum**										
(Fern.) Hult.				+						
Loose-sheathed Cottongrass										
E. viridi-carinatum (Engelm.) Fern.				+	+					
Thin-leaved Cottongrass										
Rhyncospora alba (L.) Vahl.					+					
White-beaked Rush										
Scirpus atrocinctus Fern.				+						
Wool Grass										
S. cyperinus (L.) Kunth.							+	+		
Wool Grass										
S. fluviatilis (Torr.) A. Gray						+				
River Bulrush										
S. hudsonianus (Michx.) Fern.					+					
Hudson Bay Bulrush										
S. microcarpus Presl.					+	+				
Small-fruited Bulrush										
S. validus Vahl. Great Bulrush								+		
ARACEAE								+		
Acorus calamus L. Sweet Flag										
Calla palustris L.								+		
Marsh Calla Lily										
LEMNACEAE										
Lemna minor L. Lesser Duckweed								+		
L. trisulca L.										
Ivy-leaved Duckweed								+		
JUNCACEAE										
Juncus brevicaudatus (Engelm.) Fern.								+		
Narrow-panicled Rush										
J. bufonius L. Toad Rush							+			
J. dudleyi Wieg.							+			
Dudley's Path Rush										
J. filiformis L. Thread Rush							+			
J. stygius L. ssp. **americanus**										
(Buchenau) Hult.				+						
American Bog Rush										
J. tenuis Willd. var. **multicornis**									+	
E. Mey. Path Rush										
J. vaseyi Englem. Vasey's Rush							+			+

Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous		Upland Deciduous		Bog Forest	Marsh		Aquatic		Disturbed	Rock Outcrop
	wS,bS	jP	MW	tA		Fen	Shore	Shore	H2O		
Luzula acuminata Raf. Hairy Woodrush			+			+					
L. parviflora (Ehrh.) Desv. Small-flowered Woodrush	+						+	+		+	
LILIACEAE											
Lilium philadelphicum L. var. **andinum** (Nutt.) Ker. Western Red Lily				+							
Maianthemum canadense Desf. var. **interius** Fern. Wild Lily-of-the-valley			+	+							
Smilacina trifolia (L.) Desf. Three-leaved Solomon's Seal					+	+					
IRIDACEAE											
Sisyrinchium montanum Greene Common Blue-eyed Grass								+			+
ORCHIDACEAE											
Calypso bulbosa (L.) Oakes Venus' Slipper Orchid			+								
Corallorhiza trifida Chat. Early Coralroot	+		+			+					
Cypripedium acaule Ait. Stemless Lady's-slipper		+	+								+
Goodyera repens (L.) R. Br. var. **ophioides** Fern. Lesser Rattlesnake Plantain	+		+								
Listera cordata (L.) R. Br. Heart-leaved Twayblade					+						
Malaxis paludosa (L.) Sw. Bog Adder's-mouth					+						
Spiranthes lacera Raf. Slender Ladies' Tresses		+								+	+
S. romanzoffiana Cham. Hooded Ladies' Tresses					+						
SALICACEAE											
Populus balsamifera L. Balsam Poplar			+	+				+			
P. tremuloides Michx. Trembling Aspen			+	+							
Salix arbusculoides Anders. Little Tree Willow						+	+	+			
S. bebbiana Sarg. Beaked Willow	+	+	+	+	+	+	+	+		+	
S. discolor Muhl. Pussy Willow			+	+							
S. lasiandra Benth. Red Willow								+			

Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous		Upland Deciduous		Bog Forest	Marsh		Aquatic		Disturbed	Rock Outcrop
	wS,bS	jP	MW	tA		Fen	Shore	Shore	H2O		
S. myrtillifolia Anderss. Myrtle-leaved Willow					+	+	+	+			
S. novae-angliae And. New England Willow					+			+			
S. pedicellaris Pursh. Bog Willow						+					
S. petiolaris J.E. Smith. Meadow Willow								+			
S. planifolia Pursh ssp. **planifolia** Flat-leaved Willow	+				+	+		+			
S. pyrifolia Anderss. Pear-leaved or Balsam Willow			+		+	+	+				
S. scouleriana Barr. Scouler's Willow		+	+					+			+
S. serissima (Bailey) Fern. Autumn Willow					+	+	+				
S. vestita Pursh. Rock Willow								+			
MYRICACEAE											
Myrica gale L. Sweet Gale						+	+	+			
BETULACEAE											
Alnus crispa (Ait.) Pursh. Green Alder	+	+	+	+						+	
A. rugosa (DuRoi) Spreng. River Alder						+		+			
Betula glandulifera (Regel) Butter. Swamp Birch					+	+	+	+			
B. glandulosa Michx. Resinous Shrub Birch					+	+	+	+			
B. neoalaskana (Sarg.) Raup. Alaska Paper Birch	+	+	+	+	+			+			+
B. papyrifera Marshall. Paper Birch	+	+	+	+				+			
B. X Sargentii Dugl. Swamp X Resinous Birch					+						
B. X uliginosa Dugl. Swamp X Alaska Birch			+	+							
B. X winteri Dugl. Paper X Alaska Birch			+	+							
Corylus cornuta Marsh var. **cornuta** Beaked Hazelnut			+	+							
URTICACEAE											
Urtica dioica L. ssp. **gracilis** (Ait.) Selander. Common Stinging Nettle								+		+	
SANTALACEAE											

Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous wS,bS/jP	Upland Deciduous MW	Upland Deciduous tA	Bog Forest	Marsh Fen	Marsh Shore	Aquatic Shore	Aquatic H2O	Disturbed	Rock Outcrop
Comandra umbellata (L.) Nutt. var. **umbellata.** Pale Comandra	+	+	+							
Geocaulon lividum (Richards.) Fern. Northern Comandra	+	+	+							+
LORANTHACEAE										
Arceuthobium americanum Nutt. Pine Mistletoe	+									
POLYGONACEAE										
Polygonum achoreum Blake. Striate Knotweed									+	
P. amphibium L. Water Persicaria					+	+	+	+		
P. aviculare L. Yard Knotweed									+	
P. cilinode Michx. Fringed Black Bindweed	+									+
P. convolvulus L. Wild Buckwheat									+	
P. erectum L. Erect Knotweed									+	
P. lapathifolium L. Dock-leaved Persicaria							+		+	
P. ramossisimum Michx. Bushy Knotweed									+	
Rumex occidentalis S. Wats. Western Dock					+	+	+			
R. orbiculatus A. Gray. Water Dock					+	+				
R. salicifolius Weinn. Narrow-leaved Dock							+		+	
CHENOPODIACEAE										
Chenopodium album L. Lamb's Quarters									+	
C. berlandieri Moq. Northern Lamb's Quarters									+	+
C. capitatum (L.) Aschers. Strawberry Blight									+	
C. hybridum L. var. **gigantospermum** (Aellen) Roulea. Maple-leaved Goosefoot									+	+
C. leptophyllum Nutt. Narrow-leaved Goosefoot									+	
CARYOPHYLLACEAE										
Arenaria lateriflora L. Grove Sandwort		+	+				+			
A. macrophylla Hook. Large-leaved Sandwort			+						+	+
Cerastium nutans Raf. Long-stalked Chickweed							+		+	

Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous		Upland Deciduous		Bog Forest	Marsh		Aquatic		Disturbed	Rock Outcrop
	wS,bS/jP		MW	tA			Fen/Shore	Shore/H2O			
Stellaria calycantha (Led.) Bong. var. **calycantha.** Northern Chickweed								+			
S. crassifolia Ehrh. Fleshy Chickweed								+			
S. longifolia Muhl. var. **longifolia** Long-leaved Chickweed			+	+	+	+	+	+			
S. longipes Goldie. Long-stalked Chickweed						+				+	+
S. media (L.) Cyrill. Common Chickweed										+	
NYMPHACEAE											
Nuphar variegatum Engelm. Yellow Pond Lily									+		
Nymphaea tetragona Georgi. Small White Water Lily									+		
CERATOPHYLLACEAE											
Ceratophyllum demersum L. Hornwort						+			+		
RANUNCULACEAE											
Actaea rubra (Ait.) Willd. Baneberry			+	+				+			
Anemone canadensis L. Canada Anemone			+	+				+			
A. patens L. var. **wolfgangiana** (Bess.) Koch. Prairie Crocus		+	+	+							+
Aquilegia brevistyla Hook. Small-flowered Columbine			+	+							
Caltha natans Pall. Floating Marsh Marigold								+	+		
C. palustris L. ssp. **palustris** Marsh Marigold						+	+	+			
Coptis trifolia (L.) Salisb. Gold-thread	+	+	+	+	+						
Ranunculus abortivus L. Smooth-leaved Buttercup								+			
R. aquatilis L. var. **capillaceus** (Thuill) DC. & v. **subrigidus** (W.B. Drew) Breit. White Water Buttercup						+			+		
R. flammula L. var. **filiformis** (Michx.) Hook. Creeping Buttercup								+			
R. gmelini DC. ssp. **gmelini** Yellow Water Buttercup						+	+	+	+		
R. lapponicus L. Lapland Buttercup	+				+	+					

Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous wS,bS/jP	Upland Deciduous MW	 tA	Bog Forest	Marsh Fen/Shore	Aquatic Shore/H2O	Disturbed	Rock Outcrop
R. macounii Britt. Macoun's Buttercup						+	+	
R. pennsylvanicus L. f. Bristly Buttercup						+	+	
R. sceleratus L. Celery-leaved Buttercup					+	+		
Thalictrum sparsiflorum Turcz. var. **richardsonii** (Gray) Boivin. Few-flowered Meadow Rue	+	+				+		
T. venulosum Trel. Veiny-leaved Meadow Rue			+					
PAPAVERAEAE								
Corydalis aurea Willd. Golden Corydalis							+	+
C. sempervirens (L.) Pers. Pink Corydalis							+	+
CRUCIFERAE								
Arabis divaricarpa A. Nels. Purple Rock Cress					+	+		+
A. holboellii Horn. Reflexed Rock Cress								+
Barbarea orthoceras Ledeb. Winter Cress; Yellow Rockett						+		
Capsella bursa-pastoris (L.) Medic. Shepherd's Purse								+
Cardamine parviflora L. var. **arenicola** Britt. Small-flowered / Sand Bitter Cress						+		
C. pensylvanica Muhl. Pennsylvania Bitter Cress						+	+	
Descurainia sophia (L.) Webb. Flixweed							+	
Erysimum cheiranthoides L. Wormseed Mustard						+	+	
Lepidium densiflorum Schrader. Common Pepper-grass							+	
L. ramosissimum Nels. Branched Pepper-grass							+	
Rorippa islandica (Oeder) Borbas. Marsh Yellow Cress						+		
Subularia aquatica L. Awlwort						+		
Thlaspi arvense L. Stinkweed or Penny Cress							+	

Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous		Upland Deciduous		Bog Forest	Marsh		Aquatic		Disturbed	Rock Outcrop
	wS,bS	jP	MW	tA		Fen	Shore	Shore	H2O		
SARRACENIACEAE											
Sarracenia purpurea L. Pitcher Plant					+	+					
DROSERACEAE											
Drosera anglica Huds. Oblong-leaved Sundew					+	+					
D. rotundifolia L. Round-leaved Sundew					+	+					
SAXIFRAGACEAE											
Heuchera richarsonii R. Br. Alum Root		+		+							+
Mitella nuda L. Mitrewort or Bishop's-cap	+	+	+	+	+						
Parnassia palustris L. ssp. **neogaea** (Fern.) Hult. Meadow Grass-of-Parnassus						+	+	+			
Ribes glandulosum Grauer. Skunk Currant	+		+					+			+
R. hudsonianum Richards. Northern Black Currant								+			
R. lacustre (Pers.) Poir. Bristly Black Currant	+										
R. oxyacanthoides L. var. **oxyacanthoides** Northern or Wild Gooseberry	+	+	+	+						+	
R. triste Pall. Wild Red Currant	+		+								
Saxifraga bronchialis L. Spotted Saxifrage											+
S. tricuspidata Rottb. Three-toothed Saxifrage		+									+
ROSACEAE											
Agrimonia striata Michx. Grooved Agrimony			+	+				+			
Amelanchier alnifolia Nutt. Saskatoon		+		+				+			
Fragaria virginiana Duchesne. Smooth Wild Strawberry		+	+	+				+		+	+
Geum allepicum Jacq. ssp. **strictum** (Ait.) R.T. Clausen. Yellow Avens	+		+	+						+	
G. macrophyllum Willd. ssp. **perincisum** (Rydb.) Hult. Cut-leaved Avens								+		+	
Potentilla anserina L. var. **anserina**. Silverweed								+		+	

Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous wS,bS/jP		Upland Deciduous MW	 tA	Bog Forest	Marsh	 Fen/Shore	Aquatic Shore/H20	Disturbed	Rock Outcrop
P. arguta Pursh. White Cinquefoil			+	+				+		
P. norvegica L. ssp. **monspeliensis** (L.) Asch. & Graeby. Rough Cinquefoil			+	+			+	+	+	
P. palustris (L.) Scop. Marsh Cinquefoil					+	+	+	+		
P. pensylvanica L. var. **litoralis** (Rydb.) Boiv. Prairie Cinquefoil									+	+
P. tridentata Ait. Three-toothed Cinquefoil		+		+						+
Prunus pensylvanica L. f. Pin Cherry		+		+						+
P. virginiana L. Choke Cherry				+				+		
Rosa acicularis Lindl. Wild Prickly Rose	+	+	+	+					+	
R. woodsii Lindl. Wild Wood's Rose	+	+	+	+					+	
Rubus arcticus L. ssp. **acaulis** (Michx.) Foche. Dwarf Raspberry					+	+		+		
R. chamaemorus L. Cloudberry					+					
R. idaeus L. var. **strigosus** (Michx.) Maxim Wild Red Raspberry		+	+	+					+	+
R. pubescens Raf. Dewberry	+	+	+	+						
Spiraea alba Du Roi. Narrow-leaved Meadow-sweet			+	+				+		
LEGUMINOSAE										
Astragalus alpinus L. Alpine Milk-vetch			+	+				+		
A. americanus (Hook.) M.E. Jones American Rattlepod			+	+	+	+				
A. bodinii Sheld. var. **yukonis** (M.E. Jones) Boivin. Yukon Milk-vetch								+		
A. canadensis L. var. **canadensis** Canadian Milk-vetch									+	
Lathyrus ochroleucus Hook. Cream-colored Pea Vine	+	+	+	+						
Melilotus alba Desr. White Sweet Clover									+	
M. officinalis (L.) Lam. Yellow Sweet Clover									+	

Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous wS,bS/jP		Upland Deciduous MW	 tA	Bog Forest	Marsh Fen/Shore		Aquatic Shore/H2O		Disturbed	Rock Outcrop
Oxytropis campestris (L.) DC. var.											
gracilis (Nels.) Barneby & var.				+							
varians (Rydb.) Barneby								+			
Late Yellow Locoweed											
Trifolium hybridum L.										+	
Alsike Clover											
T. pratense L. Red Clover										+	
T. repens L. White Clover										+	
Vicia americana Muhl. var.		+	+	+				+			
americana. American Vetch											
GERANIACEAE											
Geranium bicknellii Britt.										+	
Bicknell's Wild Geranium											
CALLITRICHACEAE											
Callitriche hermaphroditica L.									+		
Northern Water Starwort											
C. verna L. Vernal Water Starwort									+		
EMPETRACEAE											
Empetrum nigrum L. Crowberry								+			+
BALSAMINACEAE											
Impatiens capensis Meerb.								+			
Spotted Touch-me-not											
RHAMNACEAE											
Rhamnus alnifolia L'Her.					+	+	+	+			
Alder-leaved Buckthorn											
HYPERICACEAE											
Hypericum majus (A. Gray) Britt					+	+					
Larger St. John's-wort											
H. mutilum L. St. John's-wort								+			
CISTACEAE											
Hudsonia tomentosa Nutt.		+									
Sand Heather											
VIOLACEAE											
Viola adunca J.E. Smith.	+	+	+	+				+			+
Early Blue Violet											
V. palustris L. Marsh Violet								+			
V. renifolia A. Gray.	+		+	+							
Kidney-leaved Violet											
V. rugulosa Greene.				+							
White Wood Violet											
ELAEAGNACEAE											
Shepherdia canadensis (L.) Nutt.	+		+	+				+			
Soap-berry											

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Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous wS,bS	 jP	Upland Deciduous MW	 tA	Bog Forest	Marsh Fen	 Shore	Aquatic Shore	 H2O	Disturbed	Rock Outcrop
ONAGRACEAE											
Circaea alpina L. Enchanter's Nightshade								+			
Epilobium angustifolium L. Fireweed	+	+	+	+						+	
E. leptophyllum Raf. Narrow-leaved Willow-herb							+				
E. palustre L. Marsh Willow-herb					+	+		+			
E. watsonii Barbey Northern Willow-herb					+		+	+			
Oenothera biennis L. Yellow Evening Primrose										+	
HALORAGIDACEAE											
Myriophyllum alterniflorum DC. Alternate-flowered Milfoil									+		
M. spicatum L. ssp. **exalbescens** (Fern.) Hult. Spiked Water Milfoil						+			+		
M. verticillatum L. var. **pectinatum** Walk. Whorled Water Milfoil						+					
HIPPURIDACEAE											
Hippurus vulgaris L. Mare's Tail						+	+		+		
ARALIACEAE											
Aralia hispida Vent. Bristly Sarsaparilla											+
A. nudicaulis L. Wild Sarsaparilla	+	+	+	+							+
UMBELLIFERAE											
Carum carvi L. Caraway								+		+	
Cicuta bulbifera L Bulb-bearing Water Hemlock						+	+	+			
C. mackenzieana Raup. MacKenzie Water Hemlock						+	+	+			
C. maculata L. var. **angustifolium** Hook. Western Water Hemlock							+	+	+		
Sium sauve Walt. Water Parsnip						+	+	+	+		
CORNACEAE											
Cornus canadensis L. Bunchberry	+	+	+	+	+						+
C. stolonifera Michx. Red-osier Dogwood	+	+	+	+				+			
PYROLACEAE											
Chimaphila umbellata (L.) Bart. ssp. **occidentalis** (Rydb.) Hult. Prince's Pine			+	+							+

Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous		Upland Deciduous		Bog Forest	Marsh	Aquatic	Disturbed	Rock Outcrop
	wS,bS	jP	MW	tA		Fen/Shore	Shore/H2O		
Moneses uniflora (L.) A. Gray	+		+						
One-flowered Wintergreen									
Monotropa uniflora L. Indian Pipe			+	+					
Pyrola asarifolia Michx. var.									
asarifolia		+	+	+					
Pink-flowered Wintergreen									
P. elliptica Nutt.			+	+					
White-flowered Wintergreen									
P. minor L. Lesser Wintergreen	+		+	+	+	+			
P. secunda L.	+	+	+	+		+			
One-sided Wintergreen									
P. virens Schweigg.	+	+	+	+					
Green-flowered Wintergreen									
ERICACEAE									
Andromeda polifolia L.					+	+			
Bog Rosemary									
Arctostaphylos uva-ursi (L.)		+		+					+
Spreng. Bearberry									
Chamaedaphne calyculata (L.)					+	+	+		
Moench. Leather-leaf									
Gaultheria hispidula (L.) Bigel.					+				
Creeping Snowberry									
Kalmia polifolia Wang. Bog Laurel					+	+			
Ledum groenlandicum Oeder.	+		+	+	+		+		
Labrador Tea									
Oxycoccus microcarpus Turcz.					+	+			
Small Bog Cranberry									
O. quadripetalus Gilib.					+				
Swamp Cranberry									
Vaccinium myrtilloides Michx.	+	+	+	+				+	+
Canada Blueberry									
V. vitis-idaea L. ssp. **minus** Lodd.	+	+	+		+			+	+
Bog Cranberry									
PRIMULACEAE									
Lysimachia thyrsiflora L.							+		
Tufted Loosestrife									
Primula mistassinica Michx.						+	+		
Dwarf Canada Primrose									
Trientalis borealis Raf.	+	+	+	+					
Northern Star Flower									
GENTIANACEAE									
Gentiana amarella L.				+			+	+	
Northern Gentian									

Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous wS,bS	 jP	Upland Deciduous MW	 tA	Bog Forest	Marsh Fen	 Shore	Aquatic Shore	 H20	Disturbed	Rock Outcrop
Halenia deflexa (Smith) Griseb. Spurred Gentian			+	+				+		+	
MENYANTHACEAE											
Menyanthes trifoliata L. Buckbean						+	+				
APOCYNACEAE											
Apocynum androsaemifolium L. Spreading Dogbane		+	+	+						+	+
POLEMONIACEAE											
Collomia linearis Nutt. Collomia										+	
HYDROPHYLLACEAE											
Phacelia franklinii (R. Br.) A. Gray. Franklin's Phacelia		+		+						+	+
BORAGINACEAE											
Lappula echinata Gilib. Bluebur										+	
Mertensia paniculata (Ait.) G. Don. Tall Lungwort	+	+	+	+						+	
LABIATAE											
Dracocephalum parviflorum Nutt. American Dragonhead										+	
Galeopsis tetrahit L. Hemp Nettle										+	
Glechoma hederacea L. Ground Ivy										+	
Lycopus asper Greene White Water Horehound								+			
L. uniflorus Michx. Northern Water Horehound							+	+			
Mentha arvensis L. Wild Mint							+	+		+	
Nepeta cataria L. Catnip										+	
Scutellaria galericulata L. var. **epilobiifolia** (Hamilt.) Jordal. Marsh Skullcap							+	+	+		
Stachys palustris L. var. **pilosa** (Nutt.) Fern. Marsh Hedge Nettle								+		+	
SCROPHULARIACEAE											
Castilleja miniata Dougl. Red Indian Paintbrush										+	
Euphrasia arctica Lange var. **arctica**. Eyebright											+
Gratiola neglecta Tor. var. **neglecta**. Clammy Hedge-Hyssop							+	+			
Melampyrum lineare Desr. Cow-wheat		+		+							
Rhinanthus crista-galli L. Yellow Rattle								+		+	+

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Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous wS,bS	 jP	Upland Deciduous MW	 tA	Bog Forest	Marsh Fen	 Shore	Aquatic Shore	 H2O	Disturbed	Rock Outcrop
Veronica perigrina L. var. **xalapensis** (H.B.K.) St. John & Warren. Hairy Speedwell							+	+		+	
V. scutellata L. Marsh Speedwell							+	+			
LENTIBULARIACEAE											
Utricularia cornuta Michx. Horned Bladderwort						+	+				
U. intermedia Hayne Flat-leaved Bladderwort						+	+		+		
U. minor L. Lesser Bladderwort							+		+		
U. vulgaris L. var. **americana** A. Gray. Common Bladderwort						+	+		+		
PLANTAGINACEAE											
Plantago major L. Common Plantain								+		+	
RUBIACEAE											
Galium boreale L. Northern Bedstraw	+	+	+	+						+	
G. trifidum L. Small Bedstraw						+	+	+			
G. triflorum L. Sweet-scented Bedstraw				+				+			
Boustonia longifolia Gaertn. Bluets											+
CAPRIFOLIACEAE											
Linnaea borealis L. var. **americana** (Forbes) Rehd. Twinflower	+	+	+	+	+			+		+	+
Lonicera dioica L. var. **glaucescens** (Rydb.) Butters. Twining Honeysuckle			+	+							
Symphoricarpos albus (L.) Blake. White Snowberry				+							
Viburnum edule (Michx.) Raf. Low-bush Cranberry	+		+	+	+					+	
CAMPANULACEAE											
Campanula rotundifolia L. Harebell		+	+	+				+		+	+
LOBELIACEAE											
Lobelia dortmanna L. Water Lobelia									+		
COMPOSITAE											
Achillea lanulosa Nutt. Wooly Yarrow		+		+				+		+	
A. sibirica Ledeb. Siberian Milfoil				+				+		+	
Antennaria campestris Greene Meadow Everlasting											+

Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous wS,bS	 jP	Upland Deciduous MW	 tA	Bog Forest	Marsh Fen	 Shore	Aquatic Shore	 H2O	Disturbed	Rock Outcrop
A. howellii Greene var. **campestris** (Rydb.) Boivin. Howell's Everlasting		+									+
A. neodioica Greene. Everlasting											+
A. parvifolia Nutt. Everlasting								+			+
A. rosea Greene. Pussy-toes				+						+	
Arnica chamissonis Lessing ssp. **foliosa** (Nutt.) Maguire. Arnica	+	+	+	+				+			
Artemisia biennis Willd. Biennial Wormwood										+	
Aster ciliolatus Lindl. Lindley's Aster	+	+	+	+				+			+
A. hesperius Gray. Western Willow Aster				+		+	+	+		+	
A. junciformis Rydb. Rush Aster						+	+	+			
A. laevis L. Smooth Aster		+		+							+
A. puniceus L. Purple-stemmed Aster						+	+	+			
Bidens beckii Torr. Beggar-ticks						+	+	+	+		
B. cernum L. Nodding Beggar-ticks								+			
Cirsium arvense (L.) Scop. Canada Thistle										+	
Conyza canadensis (L.) Cronq. Horseweed, Canada Fleabane										+	
Crepis tectorum L. Annual Hawksbeard										+	
Erigeron acris L. var. **asteroides** (Andrz.) Bess. Fleabane											+
Erigeron hyssopifolius Michs. Fleabane								+			
E. philadelphicus L. var. **philadelphicus** Philadelphia Fleabane							+	+			
Gnaphalium uliginosum L. Cudweed										+	
Helenium autumnale L. Sneezeweed	+						+	+			
Hieracium umbellatum L. Narrow-leaved Hawkweed		+		+						+	+
Lactuca pulchella (Pursh) D.C Blue Lettuce										+	
Matricaria matricariodes (Less.) Porter. Pineappleweed										+	
Petasites frigidus (L.) Fries. Vine-leaved Colts'foot	+		+			+	+				

Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous	Upland Deciduous		Bog Forest	Marsh		Aquatic	Disturbed	Rock Outcrop
	wS,bS/jP	MW	tA		Fen	Shore	Shore/H20		
P. palmatus (Ait.) Gray Palmate-leaved Colts'-foot	+	+	+	+	+			+	
P. sagittatus (Pursh) A. Gray Arrow-leaved Colt's-foot					+	+	+	+	
Senecio congestus (R. Br.) D.C. var. **palustris** (L.) Fern. Marsh Ragwort					+	+	+		
S. indecorus Greene. Unsightly Groundsel						+	+		
S. pauperculus Michx. Depauperate Groundsel							+	+	
S. streptanthifolius Greene Northern Groundsel								+	
Solidago canadensis L. var. **canadensis**. Canada Goldenrod		+	+				+		
S. gigantea Ait. Late Goldenrod								+	
S. graminifolia (L.) Salisb. Flat-topped Goldenrod								+	
S. hispida Muhl. var. **lanata** (Hook.) Fern. Shaggy Goldenrod	+		+				+	+	+
S. multiradiata Ait. Northern Goldenrod								+	
S. spathulata D.C. var. **neomexicana** Gray. Mountain Goldenrod	+		+						
Sonchus arvensis L. Sow Thistle							+		
S. uliginosum Bieb. Perennial Sowthistle						+	+	+	
Tanacetum vulgare L. Tansy								+	
Taraxacum officinale Weber							+	+	+

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Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types						
	Upland Coniferous wS,bS/jP	Upland Deciduous MW tA	Bog Forest	Marsh Fen/Shore	Aquatic Shore/H2O	Disturbed	Rock Outcrop
SPHAGNACEAE							
Sphagnum angustifolium (Russ.) Jens.			+				
S. **compactum** DC.			+				
S. **fuscum** (Schimp.) Klinggr.			+				
S. **jensenii** Lindb.			+				
S. **magellanicum** Brid.			+				
S. **nemoreum** Scop.			+				
S. **obtusum** Warnst.			+				
S. **riparium** Angstr.			+				
S. **russowii** Warnst.			+				
S. **squarrosum** Crom.			+				
S. **warnstorfii** Russ.			+				
BRYALES							
Aulacomnium palustre (Hedw.) Loeske.			+				
Ceratodon purpureus (Hedw.) Brid.						+	
Dicranoweisia crispula (Hedw.) Lindb.					+		
Dicranum flagellare Hedw.							+
D. **polysetum** Sw.	+						+
D. **scoparium** Hedw.	+						
D. **undulatum** Brid.	+						
Drepanocladus uncinatus (Hedw.) Warnst.							
D. **vernicosus** (Lindb.) Warnst.							
Hedwigia ciliata (Hedw.) P. Beauv.							+
Helodium blandowii (Web. & Mohr.) Warnst.					+		
Hylocomium splendens (Hedw.) B.S.G.	+						
Mnium affine Bland. ex. Funck.							
Pleurozium schreberi (Brid.) Mitt.	+		+				+
Pohlia nutans (Hedw.) Lindb.			+				
Polytrichum juniperinum Hedw.	+						+
P. **piliferum** Hedw.							+
P. **strictum** Brid.			+				
Ptilium crista-castrensis (Hedw.) DeNot.	+						
Tomenthypnum nitens (Hedw.) Loeske.	+						
LICHENS							

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Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous wS,bS/jP	Upland Deciduous MW	 tA	Bog Forest	Marsh Fen/Shore	Aquatic Shore/H2O	Disturbed	Rock Outcrop
PANNARIACEAE								
Pannaria pezizoides (G. Web.) Trev.		+	+					
PELTIGERACEAE								
Peltigera aphthosa (L.) Willd.	+							
P. canina (L.) Willd.	+							
P. collina (Ach.) Schrad.	+							
LECIDIACEAE								
Rhizocarpon disporum (Naegeli) Muell.								+
CLADONIACEAE								
Cladina alpestris (L.) Harm.	+			+				+
C. mitis (Sandst.) Hale & Culb.	+			+				+
C. rangiferina (L.) Harm.	+			+				+
Cladonia arbuscula (Wallr.) Rabenh.	+							
C. amaurocraea (Florke) Schaer.	+							+
C. bellidiflora (Ach.) Schaer.	+			+				+
C. cenotea (Ach.)Schaer.	+			+				+
C. chlorophaea (Flk.) Spreng.	+			+				+
C. coccifera (L.) Willd.	+			+				+
C. cornuta (L.) Hoffm.	+			+				+
C. crispata (Ach.) Flot.	+							
C. deformis (L.) Hoffm.	+			+				+
C. digitata (L.) Hoffm.				+				
C. fimbriata (L.) Fr.	+			+				
C. furcata (Huds.) Schrad.	+							
C. gonecha (Ach.) Asah.				+				+
C. gracilis (L.) Willd.	+			+				+
C. phyllophora Hoffm.				+				+
C. pyxidata (L.) Hoffm.				+				+
C. subtenuis (Abb.) Evans	+							
C. uncialis (L.) Wigg.	+							+
STEREOCAULACEAE								
Stereocaulon paschale (L.) Hoffm.	+							+
S. saxatile Magn.	+							+
S. tomentosum Fr.	+							+
UMBILICARIACEAE								
Actinogyra muhlenbergii (Ach.) Schol.								+
Umbilicaria deusta (L.) Baumg.								+
U. proboscidea (L.) Schrad.								+
U. torrefacta (Lightf.) Schrad.								+

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Table D-3 (continued). Vascular plants and habitat associations of the La Ronge Greenstone Belt.

Family/Species	Habitat Types Upland Coniferous wS,bS/jP	Upland Deciduous MW tA	Bog Forest	Marsh Fen/Shore	Aquatic Shore/H20	Disturbed	Rock Outcrop
LECANORACEAE							
Icmadophila ericetorum (L.) Zahlbr.			+				
Lecanora sp.							+
L. polytropa (Ehrh.) Rabenh.							+
PARMELIACEAE							
Cetraria ciliaris Ach.			+				
C. **ericetorum** Opiz. var. **reticulata** Opiz.							+
C. **islandica** (L.) Ach.							+
C. **nivalis** (L.) Ach.	+						+
C. **pinastri** (Scop.) S. Gray			+				
Parmelia alpicola Th. Fr.							+
P. **centrifuga** (L.) Ach.							+
P. **sulcata** Tayl.			+				+
P. **taractica** Kreap.							+
USNEAACEAE							
Evernia mesomorpha Nyl.			+				
Ramalina farinacea (L.) Ach.			+				
Usnea cavernosa Tuck.			+				

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APPENDIX D-2. FIGURES

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Figure D-1. Tree terrain relationships in the mixedwood ecodistrict.

Figure D-2. Tree terrain relationships in the northern coniferous ecodistrict.

Figure D-3. Forest inventory mapping system coverage.

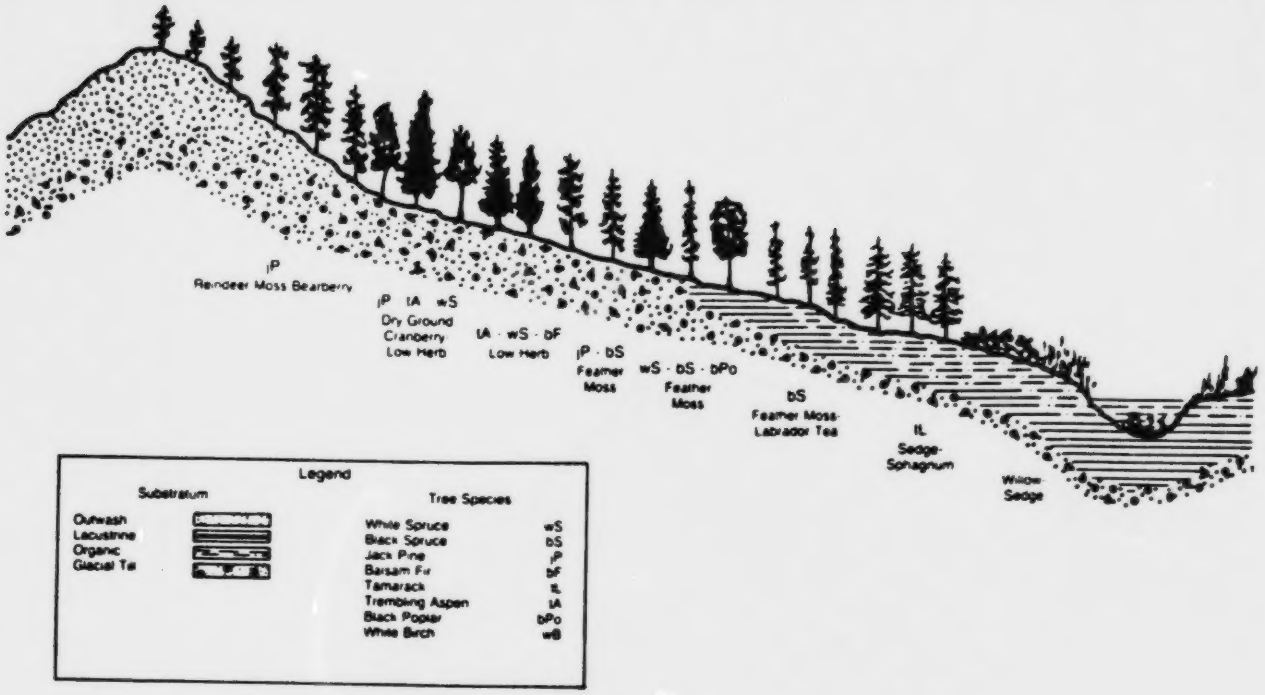

jP
Reindeer Moss Bearberry
jP · tA · wS
Dry Ground
Cranberry
Low Herb
tA · wS · bF
Low Herb
jP · bS
Feather
Moss
wS · bS · bPo
Feather
Moss
bS
Feather Moss
Labrador Tea
tL
Sedge
Sphagnum
Willow
Sedge
Legend
Substratum
Outwash
Lacustrine
Organic
Glacial Till
Tree Species
White Spruce wS
Black Spruce bS
Jack Pine jP
Balsam Fir bF
Tamarack tL
Trembling Aspen tA
Black Poplar bPo
White Birch wB

Figure D-1. Tree-terrain relationships in the Mixedwood Ecodistrict.

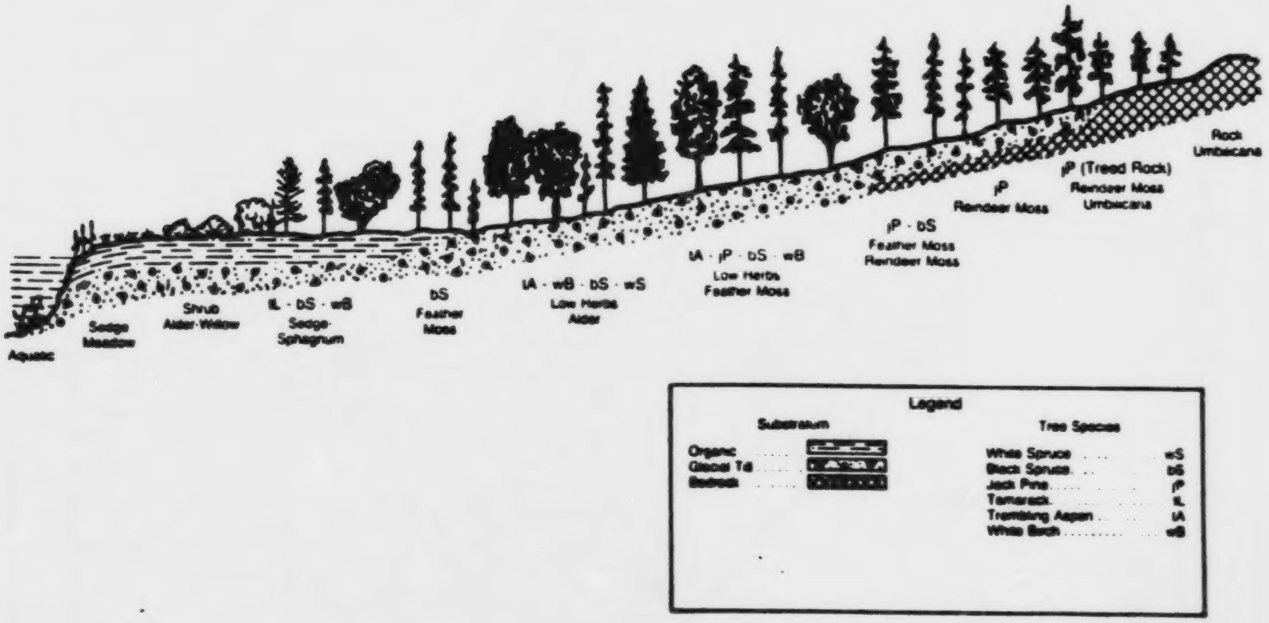
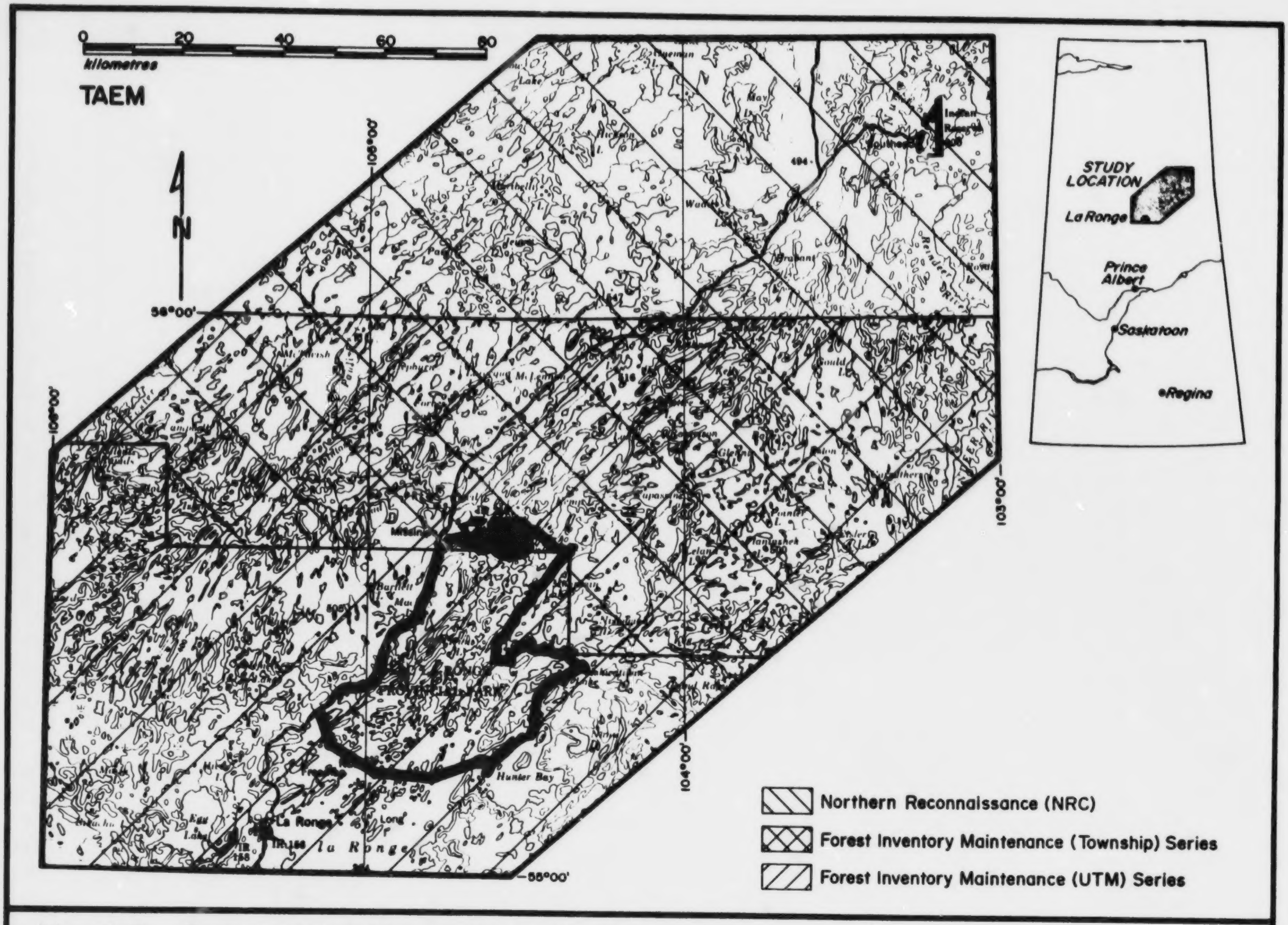

Aquatic
Sedge
Meadow
Shrub
Alder-Willow
tL · bS · wB
Sedge
Sphagnum
bS
Feather
Moss
tA · wB · bS · wS
Low Herbs
Alder
tA · jP · bS · wB
Low Herbs
Feather Moss
jP · bS
Feather Moss
Reindeer Moss
jP
Reindeer Moss
jP (Treed Rock)
Reindeer Moss
Umbilicaria
Rock
Umbilicaria
Legend
Substratum
Organic
Glacial Till
Bedrock
Tree Species
White Spruce wS
Black Spruce bS
Jack Pine jP
Tamarack tL
Trembling Aspen tA
White Birch wB

Figure D-2. Tree-terrain relationships in the Northern Coniferous Ecodistrict.


0
20
40
60
80
kilometres
TAEM
N
56°00'
106°00'
108°00'
104°00'
103°00'
55°00'
STUDY LOCATION
La Ronge
Prince Albert
Saskatoon
Regina
Hunter Bay
La Ronge
Lac la Ronge
Reindeer River
Northern Reconnaissance (NRC)
Forest Inventory Maintenance (Township) Series
Forest Inventory Maintenance (UTM) Series

Map D.3. Forest Inventory Mapping System Coverage

SECTION E
WILDLIFE

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1.0 INTRODUCTION

The major types of wildlife addressed in this report include the birds and mammals. The sensitivity of wildlife to human activity is dependent on factors such as habitat requirements, physiological requirements, population size, and distribution of the species. Because many species have similar habits, they also have similar sensitivities to disturbance and, thus, may be discussed as a group when considering the potential for impacts.

The potential impacts to wildlife resulting from industrial development in the Greenstone region would result primarily from habitat losses or disturbances which may result in reproductive failure or a shift in distribution and movement patterns.

Few specific studies of wildlife have been conducted in the Greenstone region. The Churchill River Study: Wildlife (Barber et al. 1975) is the most complete wildlife document on the area. Unfortunately the data are largely limited to the east half of the region and are 12 years old. Specific current information on wildlife abundance and distribution for the area is limited. However, based on the behavior and life histories of the animals and the effects of disturbances observed elsewhere, general sensitivities to developments may be identified. Table E-1 summarizes the source materials most relevant to the wildlife component of this study.

2.0 BIRDS

The major groups of birds addressed here include: Waterfowl and related species, Raptors, Upland Game Birds, Colonial Nesting Birds, Passerines and Shorebirds. A provisional checklist of species for the La Ronge Greenstone Belt is provided in Table E-2.

2.1 Waterfowl and Related Species

Twenty-two species of ducks, geese, swans, loons, grebes and/or bitterns, and cranes nest in the Greenstone area; 14 others migrate through the region in the spring and fall on their way to and from their more northerly breeding ranges. Populations of these species in boreal regions such as the Greenstone area, are generally low because few waterbodies contain significant stands of suitable emergent vegetation to support nesting, brooding, and rearing activities. However, these regions may serve as important refuges for southern waterfowl populations during drought years when parkland potholes are scarce.

Studies at Key Lake, north of the Greenstone area, showed that diving ducks (primarily mergansers and loons) are the most common waterfowl species (Beak 1979). The most abundant dabbling species that breeds in the area is the Mallard (Barber et al. 1975). Other ducks that can be expected to be relatively abundant include the Lesser Scaup, Ring-necked Duck, and Common Goldeneye. Some limited annual sport harvest data for waterfowl are reported for the Greenstone Belt (Table E-4); unregulated subsistence harvest data are not available.

Bogs and fens which were surveyed along the more southerly Churchill River drainage system were estimated to have an average of 0.9 and

1.6 adult ducks/km of shoreline, respectively. Bogs supported a higher density of divers and fens had more dabblers (Barber et al. 1975).

Waterfowl are most sensitive to habitat loss caused by road or facility development, and habitat modification caused by alterations in water levels, qualities, or flows.

The most sensitive periods in the life history of these species occur in the spring through early summer when nesting and rearing occur, and during the fall when birds are foraging to build up body fat reserves required for migration.

2.2 Raptors

Bald Eagles and Ospreys are the most notable among 12 breeding species of eagles, hawks, falcons, and owls. Bald Eagles are especially numerous in the region, with large breeding populations along the Churchill and Reindeer Rivers (Whitfield et al. 1974, SPRR 1984). Birds from these areas have been captured each year since 1983 with the assistance of the Saskatchewan government for the re-establishment of breeding populations in the United States. Golden Eagles, cliff nesters, may also occur in the study area.

Bald Eagles are generally found in close proximity to larger lakes and rivers, and frequently select islands, narrow peninsulas, or the narrow isthmuses between adjacent lakes as nesting sites. Eagles prefer large mature poplar trees for nest construction with the large centrally located notch providing an ideal construction site (Barber et al. 1975). Fish are the principal food consumed by eagles and ideal habitats include fast flowing, fish-bearing creeks which are free of ice early in the spring. The location of all documented nest sites in the study region over the past 15 years are presented on Map-E (Adam pers. comm.). Barber et al. (1975) estimated requirements of 14, 45, and 265 km of shoreline per breeding eagle territory for the Churchill River, Wapiskau Rivers, and upland lake/stream areas, respectively. The current status of many of the nest sites is unknown; Gerrard et al. (1983) estimated a median nest life of only 5 years for Besnard Lake, which is located to the immediate southwest of the study area.

Ospreys are also distributed throughout the boreal forest region of Saskatchewan and like eagles forage extensively on fish. However, the data base on population distribution and size is limited to isolated nest sightings.

Peregrine Falcons are officially classified as a rare and endangered (COSEWIC) species and have been the subject of intensive studies and survey monitoring throughout Canada in recent years. However, resident breeding populations have not been monitored in this area.

In general, raptors are most sensitive to disturbance during the spring while establishing nesting territories, breeding and incubating eggs. Minor disturbances in the nesting area during this period can cause abandonment and/or nest failure.

2.3 Upland Game Birds

This group includes 5 species of grouse and grouse-like birds. Spruce Grouse, which are largely dependent on upland habitats such as aspen-conifer or pine forests, are the most abundant species. The less common Ruffed Grouse generally are found in close proximity to willow flats and upland hardwood habitats. Populations of both species are characterized by dramatic periodic fluctuations (Johnsgard 1983);

harvest statistics for 1976-85 are presented in Table E-4. Large numbers of Willow Ptarmigan are periodically found in association with willow areas during winter (Barber et al. 1975).

Grouse are most sensitive to disturbance during May-June when courtship display dominates male activity, and during June-July when nesting and brood rearing activity dominate female activity.

2.4 Colonial-nesting Birds (Gulls and Terns)

The most common breeding species reported for the region include Bonaparte's Gull, Herring Gull, Mew Gull, and California Gull. The Common Tern and Arctic Tern are the most common terns. Fish are the major component of the diets of all these species.

All colonial-nesting birds, except the Bonaparte's Gull, nest on the ground on low rocky islands which increases their vulnerability to predation and inclement weather conditions. Because the birds of a colony are concentrated in a small area, the region's population can be seriously affected if the colony is disturbed. Although Bonaparte's Gull is a tree nester, their colonies remain sensitive to disturbance.

The majority (65%) of the 28 Herring Gull and Common Tern colonies mapped for the Churchill River Study were located on small rocky islands on Reindeer Lake; the remainder were found at upland lakes and river channels (Barber et al. 1975). The average size of these nesting islands was less than 1000 m^2 in size and sparsely vegetated.

Colonial nester are most sensitive to disturbance during the spring and summer open water season, a period of nesting and brood rearing.

2.5 Passerines, Shorebirds and Others

This group includes a wide range of species with diverse life histories. Most are sensitive to habitat loss and, to a lesser degree, disturbance. Both the greatest diversity of species and the highest average density of birds is usually found in deciduous mixed-wood areas.

3.0 MAMMALS

Ungulates and furbearers are the most important mammalian species in the area from a social and economic perspective. Ungulates are the principal source of red meat, and skins from furbearers and a primary source of earned income for many subsistence users and/or trappers. In addition, big game species (ungulates and bears) are valued by resident sport hunters and by hunting outfitters who cater to non-resident sportsmen. Game Management Zones are found on Map E.

A number of other mammalian species, generally grouped as small mammals, are not perceived in the same positive social and economic context. However, these animals are important as many predators are dependent upon them as a primary food source.

A list of the mammalian species which can be expected within the Greenstone area is presented in Table E-3.

3.1 Ungulates

Three species of ungulates are common to the region. Moose are the most abundant followed by woodland caribou and white-tailed deer. Mule deer are uncommon and historical accounts of barren ground caribou winter migrations have not been reported this far south since the late 1940's (Banfield 1954, Kelsall 1968).

A summary of big game sport harvest data for the period 1976-85 is presented in Table E-4; these data do not include animals taken by unregulated subsistence native hunters. Unregulated harvest is likely significantly higher than sport harvest (Trottier, pers. comm.).

Ungulates are most sensitive to disturbance during spring calving seasons in May-June, during the fall rut and during late winter when animal activity may be restricted by excessive snow depths.

3.1.1 Moose

Moose are the largest ungulate in the province. Their winter diet consists primarily of the most current years' growth of twigs from hardwood shrubs. Preferred species within the study area include willows, dogwood, aspen, poplar, pin cherry, and saskatoon (Barber et al. 1975); other species which are abundant but infrequently browsed are the alders, and saplings of jack pine and spruce.

Moose winter habitat selections reflect these established dietary preferences. Most of the hardwood browse species, particularly willows, abound in the river riparian communities (approx. 46,000 stems/ha) and to a lesser extent in young regenerating fire disturbed stands (approx. 20,000 stems/ha) and poorly drained peat-land areas (approx. 13,000 stems/ha) as reported by Barber et al. (1975).

Lands within the Churchill River Study area were rated as good, fair, or poor for moose based largely on the presence and age of fire disturbance. 'Good' (Class 1) habitats were defined as those recently burned (<10 years) and regenerating areas and south-facing slopes supporting a high density of mature aspen, and 0.2-0.4 moose/km^2. Fair (Class 2) habitats are those capable of supporting 0.1-0.2 moose/km^2 and are generally associated with recent burns or areas with moderate densities of suitable browse species. Remaining areas which were largely composed of extensive tracts of mature coniferous forests, provided little in the way of forage resources and were rated as poor moose habitats capable of supporting <0.1 moose/km^2.

Summer is also critical to moose as it is during the growing season that most of the energy-expensive physiological processes including growth, lactation, and antler development occur. Moose become more cosmopolitan in their diet selection, favoring highly digestible and nutritious foliage from hardwood shrubs and other terrestrial and aquatic plants, the latter of which are rich in essential minerals. Animals which experience long growing seasons enter the rut and winter in superior condition which may enhance reproductive success and winter survival (Stewart et al. 1977). Low lying (stream banks, lake shores, willow flats, bogs and fens) areas which offer an abundance of preferred forage items may receive high summer moose use.

Despite the fact that moose are recognized as the most important and abundant ungulate in the area, little population data relevant to management of the species has been collected since the Churchill River Study was completed in the mid-1970's. Only two aerial surveys, one in the Star Lake area and another near Waddy Lake have been conducted in recent years (January and February 1984; SMDC 1985). The location of all survey blocks are plotted on Map E and results are presented in Table E-5. For the purposes of this report, recent burns (<10 years) and extensive river and lake shore zones identified during the Churchill River Wildlife Study have been rated and mapped as good moose habitats.

Moose are particularly susceptible to activities such as road construction which would increase their vulnerability to sport and/or unregulated harvest.

3.1.2 Woodland Caribou

Woodland caribou are a species of concern to Saskatchewan wildlife managers and other conservationists. Apparent population declines over the past two decades have resulted in a proposed complete sport hunting ban for the province in 1987 (SPRR 1986). The Greenstone Belt comprises traditional ranges for the species in the province.

Woodland caribou populations and biology are not well documented. Most relevant data are restricted to a catalogue of sightings made in recent years (Map E, general locations only) and compiled by SPRR (Trottier, pers. comm.). Other incidental observations have been made during aerial surveys for moose (Churchill River Study 1974, Star Lake and Waddy Lake 1984). Saskatchewan Parks and Renewable Resources are currently experimenting with survey techniques on woodland caribou, but these recent efforts have focused attention outside the primary study area.

Population surveys flown during 1986-87 in the Weyakwin and Hanson Lake areas (approx. 1800 km^2 blocks) to the south and southeast of the Greenstone Belt, respectively, both yielded estimates of approximately 1 woodland caribou/45 km^2 (T. Rock, pers. comm.). Both populations had low proportions of bulls and calves; estimates of 39 bulls/100 cows/27 calves for the Weyakwin animals and 33 bulls/100 cows/33 calves for the Hanson Lake herds are cause for concern. It is unlikely that populations with so few calves would be able to sustain even moderate harvest without being forced into decline (Caughley 1980). In addition to these, 3 separate inventories (December, February, March-April) of a survey block (2300 km^2) in the Key Lake area to the north of the La Ronge Greenstone Belt in 1982 resulted in an average estimate of 1 caribou/28.8 km^2 (IES 1982). Good population estimates are not available for the study area.

Investigations conducted elsewhere have documented a number of specifics of caribou behavior and habitat requirements. Woodland caribou are an ungulate of the mature coniferous forest with a strong winter dietary preference for terrestrial and arboreal lichens; mature jack pine forests, black spruce stands, and organic peat-lands are therefore important as caribou wintering areas. During summer, woodland caribou may be expected to forage on most available plants in their environment (Bergerud 1972) with rates of utilization dependent on both palatability and availability.

During the calving season, pregnant females are frequently found in close association with lowland habitats or islands on large lakes (Fuller and Keith 1981, Edmonds and Bloomfield 1984, Cumming and Beange, cited by Edmonds and Bloomfield 1984), which is likely an effective predator avoidance strategy. Herd sizes increase with the onset of rut when extensive use of both upland forested (Edmonds and Bloomfield 1984) and open lowland (Fuller and Keith 1981) habitats has been observed.

Woodland caribou are extremely sensitive to increased harvest which may result from improved access into once remote areas, or activities such as forest harvesting or fire which remove mature forest overstory.

3.1.3 Barren ground Caribou

Barren ground caribou are not resident to northern Saskatchewan, but portions of either the Beverly or Kaminuriak herds infrequently (in recent times) winter within the province (TAEM 1986). A more expansive historical use of winter range brought animals as far south as La Ronge in the late 1940's (Banfield 1954), but for most of the past four decades, populations are believed to have declined and ranges contracted. A southward movement as far as the north end of Reindeer Lake by Beverly Herd animals in 1979/80 is the most recent record for animals approaching the Greenstone study area.

It is important to note that the population status of both the Beverly and Kaminuriak herds have improved dramatically in the period 1980-86 and that the Kaminuriak herd has made more extensive use of southern Manitoba winter ranges than has been reported for 20 years (TAEM 1986). Higher populations of these herds may result in a more frequent exploitation of former winter ranges and periodically bring some animals into the northern extreme of the study area. Barren ground caribou would be most sensitive to developments which increase vulnerability to harvest caused by improved road access to the region.

3.1.4 White-tailed Deer

Although white-tailed deer are found throughout the area, populations are low and decline sharply in abundance at more northerly latitudes. Populations will do best in early successional areas which offer an abundance of pioneering forbs and regenerating shrubs in close proximity to thermal cover. Populations are vulnerable to periodic severe winters which may result in high mortality and reduced reproductive performance.

3.2 Furbearers

Furbearers are an economically and biologically valuable resource within the Greenstone Belt. Many species enjoy wide distribution and numerous trappers participate in their harvests. The location of fur trapping blocks and harvest statistics for the Greenstone Belt are provided (Figure E-1, Tables E-6 to E-16). Specific information on locations of trap lines or group trapping areas are available from SPRR (W. Runge, Prince Albert). Squirrel, muskrat, beaver, mink, and weasels are the most commonly trapped species.

3.2.1 Semi-Aquatic

The interspersion of numerous lakes, streams, rivers, and upland habitats contributes to abundant semi-aquatic and terrestrial furbearer resources in the region.

The semi-aquatic species include mink and otter, beaver and muskrat. Biological investigations were undertaken as part of the Churchill River study (Barber et al. 1975).

For mink and otter, fish and crayfish were found to be the principal prey. Back eddies associated with rapids constituted the most productive areas for these prey and as such were highly rated as mink and otter habitats. Most of the mink and otter activity in the region was centered around the Churchill, Wapiskau, and Reindeer Rivers (Map E).

Shallow lakes, which support dense stands of cattails and reed grasses in conjunction with the occurrence of pond weeds like water lily, are essential components of quality muskrat habitats. Only localized areas within the major river drainages or upland lakes of the Greenstone Belt offer these conditions. A number of these sites were mapped for the Churchill River Study (SPRR Files, Saskatoon) but most were too small and localized for map presentation.

The density of beaver colonies declines markedly between the southern (0.22 colonies/km^2) and northern extremes (0.07 colonies/km^2) of the Greenstone Belt. Beavers are dependent upon the availability of hardwood shrubs and trees in close association with suitable water (lakes, rivers, streams, impoundments) for survival. Hardwood volumes (white birch, aspen) decline and softwoods (black spruce, jack pine) increase as one progresses northward (Map D), effectively reducing the quantity and quality of beaver forage resources. Barber et al. (1975) found fire to be important to beaver ecology in that populations responded favorably to 12-15 year old regenerating stands, particularly in more southerly parts of the region where the hardwoods were most prevalent.

The major river systems of the Greenstone Belt have been mapped (Map E) as important habitats for beaver. Most of the beaver colonies are associated with the creeks and drainages in which water can be stabilized by dam construction. This does not presume that other significant habitats do not exist throughout the region. A number of areas had previously been documented and mapped in more detail for the Churchill River Study (SPRR Files, Wildlife Research Library, Saskatoon).

Beaver and muskrat populations would be most sensitive to development activities which change water flows and/or levels, and shoreline vegetation. This may be particularly true during fall and winter when animals are unable to relocate following dramatic changes in water level.

3.2.2 Terrestrial

A number of terrestrial furbearers are also common to the region including snowshoe hare, red squirrel, marten, fisher, wolf, coyote, red fox, lynx and bear. Fisher, which depend to a large extent on porcupines and snowshoe hare are the most frequently trapped land fur. Bear are hunted as well as trapped and as such are also classified as a big game species. Sport harvest and recreation statistics are provided (Table E-4).

Most terrestrial furbearers maintain strong habitat associations to upland communities. Development activities which result in improved access increasing vulnerability to hunter and/or trapper harvest will have the greatest impacts.

4.0 REPTILES AND AMPHIBIANS

Only 5 species of reptiles and amphibians are reported for northern Saskatchewan (Cook 1978, Secoy and Vincent 1976, Secoy and Ramaekers 1980). These include the Canadian Toad (*Bufo americanus hemiphrys*), the Boreal Chorus Frog (*Pseudacris triseriata maculata*), the Wood Frog (*Rana sylvatica*), the Leopard Frog (*Rana pipiens*), and the red-sided garter snake (*Thamnophis sirtalis parietalis*).

Populations are not abundant owing to climatic limitations.

5.0 RARE AND ENDANGERED WILDLIFE

The La Ronge Greenstone Belt area is not a particularly sensitive area for rare or endangered species of wildlife. The Great Gray Owl (Strix nebulosa) is the only wildlife species which has been classified as rare by COSEWIC (April 1979) and which likely breeds in the region.

The Canadian great gray population is estimated to be between 5000-50,000 birds with numbers fluctuating in response to small mammal population abundance. These birds typically use stick nests of other species as nesting sites. Great Gray Owls are the sixth most sought after bird by bird watchers in North America.

Golden Eagles have not yet been classified as rare in Canada, but populations are not abundant. The Foster Lakes-Churchill River area is reputed to be an important nesting area for the species. Sharp cliff faces are important for nest establishment.

A number of other migrants which have been classified as rare, endangered, or threatened may on occasion migrate through the area on route to or returning from breeding grounds further north.

6.0 BIBLIOGRAPHY

1). Adam, C.I.G. 1985. Natural areas in Saskatchewan: A review of the IBP system. Prepared for the Saskatchewan Natural History Society. Saskatoon, Sask.

2). Banfield, A.W.F. 1954. Preliminary investigations of the barren ground caribou: Part I Former and present distribution, migrations, and status. Dept. of Northern Affairs and Natl. Resources, Natl. Parks Branch. Canadian Wildlife Service. Wildlife Management Bulletin, Series 1, No. 10A. 79pp.

3). Bergerud, A.T. 1972. Food habits of Newfoundland caribou. J. Wildl. Manage. 36(3): 913-923.

4). ________ 1974. The Mammals of Canada. Nat. Mus. Natur. Sci., Nat. Mus. Can., Univ. of Toronto Press, Toronto.

5). Barber, S.R., H.A. Stelfox, and J.D. Boden. 1975. Churchill River study, wildlife (Sask.). Saskatchewan Parks & Renewable Resources, Saskatoon.

6). Beak Consultants Limited. 1979. Wildlife Resources: Key Lake Project. In: Environmental impact assessment of Key Lake Project. Prepared for Key Lake Mining Project.

7). Beck, W.H. 1958. A guide to Saskatchewan mammals. Sask. Nat. Hist. Soc., Spec. Pub. No. 1, Regina, Sask. 52pp.

8). Bent, A.C. 1961. Life Histories of North American Birds of Prey. Part One. Dover Publications Inc., New York.

9). ________ 1961. Life Histories of North American Birds of Prey. Part Two. Dover Publications Inc., New York.

10). ________ 1962. Life Histories of North American Shorebirds. Part 1. Dover Publications Inc., New York.

11). ________ 1962. Life Histories of North American Wild Fowl. Part 2. Dover Publications Inc., New York.

12). ________ 1963. Life Histories of North American Gulls and Terns. Dover Publications Inc., New York.

13). ________ 1963. Life Histories of North American Marsh Birds. Dover Publications Inc., New York.

14). Caughley, G. 1980. Analysis of Vertebrate Populations. John Wiley and Sons. 234pp.

15). Chapman, J.A. and George A. Feldhamer (ed). 1982. Wild mammals of North America. The Johns Hopkins University Press, Baltimore and London.

16). Cook, F. 1978. A guide to the Amphibians and Reptiles of Saskatchewan. Sask. Mus. Nat. Hist., Pop. Ser. 13, 27pp.

17). COSEWIC. 1979. Status report on Great Gray Owl Strix nebulosa in Canada. Prepared by R.W. Nero for Manitoba Depertment of Mines, Natural Resources and Environment.

18). Davis, D.W. 1966. A plea for conservation of the Bald Eagle in Saskatchewan. Blue Jay 24: 160-167.

19). Edmonds, E.J. and M. Bloomfield. 1984. A study of Woodland Caribou (Rangifer tarandus caribou) in westcentral Alberta, 1979-83. Alberta Energy and Natural Resources, Fish and Wildlife Division. 203 pp.

20). Fuller, T.K. and L.B. Keith. 1981. Woodland caribou population dynamics in northeastern Alberta. AOSERP Report 101. 76pp.

21). Gerrard, J.M. and D.W.A. Whitfield. 1967. Bald Eagle Banding in Northern Saskatchewan (1967). Blue Jay 25: 177-183.

22). Gerrard, J.M., P. Gerrard, W.J. Maher, and D.W.A. Whitfield. 1975. Factors influencing rest site selection of bald eagles in northern Saskatchewan and Manitoba. Blue Jay 33: 119-196.

23). Gerrard, J.M., P.N. Gerrard, G.R. Bortolotti and D.W.A. Whitfield. 1983. A 14-year study of Bald Eagle reproduction on Besnard Lake, Saskatchewan. In: D.M. Bird, N.R. Seymour and J.N. Gerrard, eds. Biology and Management of Bald Eagles and Ospreys. MacDonald Raptor Research Center of McGill University, Raptor Research Foundation, Inc.

24). Godfrey, W.E. 1970. Canada's endangered birds. Can. Field Natur. 84: 24-26.

25). ________ 1986. The Birds of Canada. Revised Edition. National Museums of Canada. Ottawa, Canada.

26). Godwin, C.E. 1977. Rare and threatened birds of Canada. 85-87pp. In: Masquin T. and C. Suchal. 1977. Canada's Threatened Species and Habitats. Can. Nature Fed., Ottawa.

27). Gollop, J.B. 1969. Birds in Saskatchewan. In: Richards, J.H., and K.I. Fung (eds). Atlas of Saskatchewan. Univ. of Saskatchewan. Saskatoon, Sask. 84pp.

28). Haig, S. 1983. Piping plover - how many are left? Blue Jay 41: 121.

29). Hall, E.R. and K.R. Kelson. 1959. The Mammals of North America. Volumes I and II. The Ronald Press Company, New York.

30). Harmata, A.R., John E. Toepfer and John M. Gerrard. 1985. Fall migration of Bald Eagles produced in northern Saskatchewan. Blue Jay 43: 232-237.

31). Harris, W.C., A. Kabzems, A.L. Kosowan, G.A. Padburry, and J.S. Rowe. 1983. Ecological regions of Saskatchewan. Tech. Bull. No. 10. Forestry Division, Department of Parks and Renewable Resources.

32). Hauge, T.M., and L.B. Keith. 1980. Dynamics of moose populations in the AOSERP study area in northeastern Alberta. AOSERP Project LS 21.1.1. 76pp.

33). Hohn, E.O. 1972. White-tailed deer in northern Saskatchewan. Blue Jay 30: 51-57.

34). ________ 1984. Willow Ptarmigan in the Boreal Forest of the prairie provinces. Blue Jay 42: 83-88.

35). Integrated Environmental Sciences. 1982. Winter ungulate surveys, Key Lake, Saskatchewan, 1981-82. Prepared for Key Lake Mining Corporation.

36). Johnsgard, Paul A. 1983. The Grouse of the World. Univ. of Nebraska Press, Lincoln, Nebraska. 413 pp.

37). Kelsall, J.P. 1968. The migratory barren ground caribou of Canada. Dept. of Indian Affairs and Northern Development, Canadian Wildlife Service. Ottawa, Canada. 340 pp. and maps.

38). Maher, W.S. 1969. Mammals in Saskatchewan. 80-82 pp. In: Richards, J.H., and K.I. Fung (eds). Atlas of Saskatchewan. University of Saskatchewan, Saskatoon p 80-82.

39). Mondor, C.A. 1973. Report on the National Park Reconnaissance of the Churchill River, Sask. Indian and Northern Affairs, Parks Canada. Document # 10325.

40). Nero, R.W. 1967. The Birds of northeastern Saskatchewan. Special publication No. 6. Saskatchewan Natural History Society, Regina, Sask.

41). Riome, S.D. 1971. Observations on the Churchill, Sturgeon-Weir and Saskatchewan Rivers from Patunak to The Pas. Blue Jay 29: 90-93.

42). Robins, C.S., B. Braun & H.S. Zim. 1966. Birds of North America. Golden Press, N.Y.

43). Runge, W., and J. Mulhern. 1985. The status of wild furbearers in Saskatchewan. Saskatchewan Parks and Renewable Resources. Regina, Sask.

44). Salt, W. R. and J.R. Salt.. 1976. The Birds of Alberta. Hurtig Publishers. Edmonton, Alberta.

45). Saskatchewan Mining Development Corporation. 1985a. Star Lake Gold Mine Environmental Impact Assessment. SMDC-Starrex Mining Corp. Ltd.

46). _______ 1985 b. Star Lake Gold Mine Environmental Impact Assessment. Volume 3, Appendix K. SMDC- Starrex Mining Corporation Ltd.

47). Saskatchewan Parks and Renewable Resources. 1976. Saskatchewan Game Management Harvest 1975-76. Wildlife Branch. Regina, Sask.

48). ________ 1977 Saskatchewan Game Management Harvest 1976-77. Wildlife Branch. Regina, Sask.

49). ________ 1978 Saskatchewan Game Management Harvest 1977-78. Wildlife Branch. Regina, Sask.

50). ________ 1979. Saskatchewan Game Management Harvest 1978-79. Wildlife Branch. Regina, Sask.

51). ________ 1980. Saskatchewan Game Management Harvest 1979-80. Wildlife Branch. Regina, Sask.

52). ________ 1981. Saskatchewan Game Management Harvest 1980-81. Wildlife Branch. Regina, Sask.

53). ________ 1982. Saskatchewan Game Management 1981-82. Wildlife Branch. Regina, Sask.

54). ________ 1983. Saskatchewan Game Management 1982-83. Wildlife Branch. Regina, Sask.

55). ________ 1984. Saskatchewan Game Management 1983-84. Wildlife Branch. Regina, Sask.

56). ________ 1985a. Harvest & cash value for conservation areas. 1984 - 1985. Wildlife Branch, Fur Division.

57). ________ 1985b. Saskatchewan Game Management 1984-85. Wildlife Branch. Regina, Sask.

58). ________ 1986. Saskatchewan Game Management 1985-86. Wildlife Branch. Regina, Sask.

59). Secoy, D.M. and E. Maw. 1978. Notes on birds at Waddy Lake, Saskatchewan. July 1977. Blue Jay 36: 207-209.

60). Secoy, D and P. Ramaekers. 1980. Additional records of the red-sided garter snake in Saskatchewan. Blue Jay 38: 16.

61). Secoy, D. and T. Vincent. 1976. Distribution and population status of Saskatchewan's amphibians and reptiles. Report to Saskatchewan Dept. of the Environment, Regina, Saskatchewan.

62). Soper, J. D. 1964. The Mammals of Alberta. The Department of Industry and Development. Edmonton, Alberta.

63). Stewart, R.R., R.R. MacLennan and J.D. Kinnear. 1977. The relationship of plant phenology to moose. SPRR Wildlife Technical Report # 3. 20pp. Regina, Sask.

64). Stewart, R.R. 1985. A sex- and age- selective strategy for moose management in Saskatchewan. In: S.L. Beasom and S.F. Robertson, eds. Game Harvest Management. Caesar Kleberg Wildlife Research Institute, Kingsville, Texas.

65). Terrestrial & Aquatic Environmental Managers Ltd. 1986. Wildlife Resources: Mammals. Appendix B. In: Environmental Impact Assessment of the 115 kv transmission line from Uranium City to Wollaston Lake. Prepared for Saskatchewan Power Corporation, Regina, Sask.

66). Wade, D.E. and D.R. Wade. 1962. Some bird observations along the La Ronge - Churchill River and Hanson Lake roads. Blue Jay 22: 10-11.

67). Whitehead, P. 1964. Bald Eagle records from the Churchill River area. Blue Jay 22: 148.

68). Whitfield, D.W.A., D.W. Davis, J.M. Gerrard and W.J. Maher. 1969. Golden Eagles in central Saskatchewan. Blue Jay 27: 74-79.

69). Whitfield, D.W.A., J.M. Gerrard, W.J. Maher, and D.W. Davis. 1974. Bald eagle habitat, density and reproduction in central Saskatchewan and Manitoba. Can. Field Natur. 88(4): 399-407.

70). Van Zyll de Jong, C.G. 1983. Handbook of Canadian Mammals. 1. Marsupials and Insectivores. National Museum of Natural Sciences.

7.0 DATA SOURCES AND CONTACTS

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6).	Dave Brewster	Big Game Biologist	SPRR	Regina
7).	Dale Hjertass	Wildlife Planner	SPRR	Regina
8).	Ed Kowal	Special Projects Biologist	SPRR	Prince Albert
9).	John Mulhern	Waterfowl/Fur Biologist	SPRR	Prince Albert
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11).	John Polson	Project Biologist	SRC	Saskatoon
12).	Bob Godwin	Bird Specialist	SRC	Saskatoon
13).	Bernie Gollop	Wildlife Scientist (Birds)	CWS	Saskatoon
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SPRR - Saskatchewan Parks and Renewable Resources, Various locations
SRC - Saskatchewan Research Council, Saskatoon
CWS - Canadian Wildlife Service, Saskatoon
DU - Ducks Unlimited, Regina, Various other locations
P - Private

APPENDIX E-1. TABLES

APPENDIX E-1. TABLES

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Table E-1. Summary of major data sources for the La Ronge Greenstone Belt, Wildlife Resources.

Discipline	Bibliographic Reference (from section 6.0)	Personal Reference (from section 7.0)
1. BIRDS		
Waterfowl and Related species	5, 45-58	9,11,16,17
Raptors	5, 21-23, 30, 45, 46, 66-68	4,5,11,17
Game Birds	5, 34, 45-58	1,17
Colonial Nesters	5, 45-58	10,17
Passerines Shorebirds & Others	27, 45-59, 66	12, 13, 17
2. MAMMALS		
Ungulates	5, 38, 45-58, 64	1,4,6,8,11
Furbearers	5, 38, 43, 45-47	1,2,4,8,9,11
3. REPTILES & AMPHIBIANS	16 ,60, 61	

Table E-2. Provisional checklist of birds of the Greenstone Belt.

Common Name	**Scientific Name**	**Group***	**Status****
Red-throated Loon	*Gavia stellata*	WF	SRB
Pacific Loon	*G. pacifica*	WF	SRB
Common Loon	*G. immer*	WF	SRB
Pied-billed Grebe	*Podilymbus podiceps*	WF	SRB
Horned Grebe	*Podiceps auritus*	WF	SRB
Red-necked Grebe	*P. grisegena*	WF	SRB
American White Pelican	*Pelecanus erythrorhynchos*	CN	SR
Double-crested Cormorant	*Phalacrocorax auritus*	CN	H
American Bittern	*Botaurus lentiginosus*	WF	SRB
Great Blue Heron	*Ardea herodias*	WF	SR
Tundra Swan	*Cygnus columbianus*	WF	M
Greater White-fronted Goose	*Anser albifrons*	WF	M
Snow Goose	*A. caerulescens*	WF	M
Ross' Goose	*A. rossii*	WF	M
Canada Goose	*Branta canadensis*	WF	SRB
Green-winged Teal	*Anas crecca*	WF	SRB
Mallard	*A. platyrhynchos*	WF	SRB
Northern Pintail	*A. acuta*	WF	SRB
Blue-winged Teal	*A. discors*	WF	SRB
Northern Shoveler	*A. clypeata*	WF	SRB
Gadwall	*A. strepera*	WF	H
American Widgeon	*A. americana*	WF	SRB
Canvasback	*Aythya valisineria*	WF	SR
Redhead	*A. americana*	WF	SRB
Ring-necked Duck	*A. collaris*	WF	SRB
Greater Scaup	*A. marila*	WF	M
Lesser Scaup	*A. affinis*	WF	SRB
White-winged Scoter	*Melanitta fusca*	WF	SRB
Surf Scoter	*M. perspicillata*	WF	SRB
Common Goldeneye	*Bucephala clangula*	WF	SRB
Bufflehead	*B. albeola*	WF	SRB
Hooded Merganser	*Lophodytes cucullatus*	WF	SR
Common Merganser	*Mergus merganser*	WF	SRB
Red-breasted Merganser	*M. serrator*	WF	SRB
Ruddy Duck	*Oxyura jamaicensis*	WF	SR
Osprey	*Pandion haliaetus*	RA	SRB
Bald Eagle	*Haliaeetus leucocephalus*	RA	SRB
Northern Harrier	*Circus cyaneus*	RA	SRB
Sharp-shinned Hawk	*Accipiter striatus*	RA	SRB

Table E-2 (continued). Provisional checklist of birds of the Greenstone Belt.

Common Name	**Scientific Name**	**Group***	**Status****
Northern Goshawk	A. gentilis	RA	PRB
Cooper's Hawk	A. cooperii	RA	S
Broad-winged Hawk	Buteo platypterus	RA	SRB
Swainson's Hawk	B. swainsoni	RA	SR
Red-tailed Hawk	B. jamaicensis	RA	SRB
Northern Rough-legged Hawk	B. lagopus	RA	M
Golden Eagle	Aquila chrysaetos	RA	PRB
American Kestrel	Falco sparverius	RA	SRB
Merlin	F. columbarius	RA	SRB
Peregrine Falcon	F. peregrinus	RA	M
Gyrfalcon	F. rusticolus	RA	WV
Spruce Grouse	Dendragapus canadensis	UG	PRB
Willow Ptarmigan	Lagopus lagopus	UG	WV
Rock Ptarmigan	L. mutus	UG	WV
Ruffed Grouse	Bonasa umbellus	UG	PRB
Sharp-tailed Grouse	Tympanuchus phasianellus	UG	PRB
Yellow Rail	Coturnicops noveboracensis	WF	SRB
Virginia Rail	Rallus limicola	WF	SRB
Sora	Porzana carolina	WF	SRB
American Coot	Fulica americana	WF	SRB
Sandhill Crane	Grus canadensis	WF	SRB
Black-bellied Plover	Pluvialis squatarola	PO	M
Lesser Golden Plover	P. dominica	PO	M
Semipalmated Plover	Charadrius semipalmatus	PO	M
Killdeer	C. vociferus	PO	SRB
Greater Yellowlegs	Tringa melanoleuca	PO	SRB
Lesser Yellowlegs	T. flavipes	PO	SRB
Solitary Sandpiper	T. solitaria	PO	SRB
Spotted Sandpiper	Actitis macularia	PO	SRB
Upland Sandpiper	Bartramia longicauda	PO	HM
Hudsonian Godwit	Limosa haemastica	PO	M
Ruddy Turnstone	Arenaria interpres	PO	M
Sanderling	Calidris alba	PO	M
Red Knot	C. canutus	PO	M
Semipalmated Sandpiper	C. pusilla	PO	M
Least Sandpiper	C. minutilla	PO	M
White-rumped Sandpiper	C. fuscicollis	PO	M
Baird's Sandpiper	C. bairdii	PO	M
Pectoral Sandpiper	C. melanotos	PO	M
Dunlin	C. alpina	PO	M
Stilt Sandpiper	C. himantopus	PO	M
Buff-breasted Sandpiper	Tryngites subruficollis	PO	M
Short-billed Dowitcher	Limnodromus griseus	PO	SRB

Table E-2 (continued). Provisional checklist of birds of the Greenstone Belt.

Common Name	**Scientific Name**	**Group***	**Status****
Long-billed Dowitcher	L. scolopaceus	PO	M
Common Snipe	Gallinago gallinago	PO	SRB
Wilson's Phalarope	Phalaropus tricolor	PO	SR
Red-necked Phalarope	P. lobatus	PO	M
Parasitic Jaeger	Stercorarius parasiticus	PO	SV
Franklin's Gull	Larus pipixcan	CN	SRB
Bonaparte's Gull	L. philadelphia	CN	SRB
Mew Gull	L. canus	CN	SRB
Ring-billed Gull	L. delawarensis	CN	SRB
California Gull	L. californicus	CN	SRB
Herring Gull	L. argentatus	CN	SRB
Caspian Tern	Sterna caspia	CN	SV
Common Tern	S. hirundo	CN	SRB
Black Tern	Chlidonias niger	CN	SRB
Mourning Dove	Zenaida macroura	PO	SV
Great Horned Owl	Bubo virginianus	RA	PRB
Snowy Owl	Nyctea scandiaca	RA	WV
Northern Hawk-owl	Surnia ulula	RA	PRB
Barred Owl	Strix varia	RA	PRB
Great Gray Owl	S. nebulosa	RA	PRB
Long-eared Owl	Asio otus	RA	SRB
Short-eared Owl	A. flammeus	RA	SRB
Boreal Owl	Aegolius funereus	RA	PRB
Common Nighthawk	Chordeiles minor	PO	SRB
Belted Kingfisher	Ceryle alcyon	PO	SRB
Yellow-bellied Sapsucker	Sphyrapicus varius	PO	SRB
Downy Woodpecker	Picoides pubescens	PO	PRB
Hairy Woodpecker	P. villosus	PO	PRB
Three-toed Woodpecker	P. tridactylus	PO	PRB
Black-backed Woodpecker	P. arcticus	PO	PRB
Northern Flicker	Colaptes auratus	PO	SRB
Pileated Woodpecker	Dryocopus pileatus	PO	PRB
Olive-sided Flycatcher	Contopus borealis	PO	SRB
Western Wood-Pewee	C. sordidulus	PO	SRB
Yellow-bellied Flycatcher	Empidonax flaviventris	PO	SRB
Alder Flycatcher	E. alnorum	PO	SRB
Least Flycatcher	E. minimus	PO	SRB
Eastern Phoebe	Sayornis phoebe	PO	SRB
Eastern Kingbird	Tyrannus tyrannus	PO	SRB
Horned Lark	Eremophila alpestris	PO	MSV
Tree Swallow	Tachycineta bicolor	PO	SRB
Bank Swallow	Riparia riparia	PO	SRB
Cliff Swallow	Hirundo pyrrhonota	PO	SRB

Table E-2 (continued). Provisional checklist of birds of the Greenstone Belt.

Common Name	**Scientific Name**	**Group***	**Status****
Barn Swallow	*H. rustica*	PO	SRB
Gray Jay	*Perisoreus canadensis*	PO	PRB
Blue Jay	*Cyanocitta cristata*	PO	PRB
Black-billed Magpie	*Pica pica*	PO	PRB
American Crow	*Corvus brachyrhynchos*	PO	SRB
Common Raven	*C. corax*	PO	PRB
Black-capped Chickadee	*Parus atricapillus*	PO	PRB
Boreal Chickadee	*P. hudsonicus*	PO	PRB
Red-breasted Nuthatch	*Sitta canadensis*	PO	SRB
Brown Creeper	*Certhia americana*	PO	SRB
House Wren	*T. aedon*	PO	SRB
Winter Wren	*Troglodytes troglodytes*	PO	SRB
Marsh Wren	*Cistothorus palustris*	PO	SRB
Sedge Wren	*Cistothorus platensis*	PO	SRB
Golden-crowned Kinglet	*Regulus satrapa*	PO	SRB
Ruby-crowned Kinglet	*R. calendula*	PO	SRB
Mountain Bluebird	*Sialia currucoides*	PO	SRB
Gray-cheeked Thrush	*Catharus minimus*	PO	M
Swainson's Thrush	*Catharus ustulatus*	PO	SRB
Hermit Thrush	*C. guttatus*	PO	SRB
Veery	*Hylocichla fuscescens*	PO	SRB
American Robin	*Turdus migratorius*	PO	SRB
Water Pipit	*Anthus spinoletta*	PO	M
Bohemian Waxwing	*Bombycilla garrulus*	PO	SRB
Cedar Waxwing	*B. cedrorum*	PO	SRB
Northern Shrike	*Lanius excubitor*	PO	WV
European Starling	*Sturnus vulgaris*	PO	SRB
Solitary Vireo	*Vireo solitarius*	PO	SRB
Warbling Vireo	*V. gilvus*	PO	SRB
Philadelphia Vireo	*V. philadelphicus*	PO	SRB
Red-eyed Vireo	*V. olivaceus*	PO	SRB
Tennessee Warbler	*Vermivora peregrina*	PO	SRB
Orange-crowned Warbler	*V. celata*	PO	SRB
Nashville Warbler	*V. ruficapilla*	PO	SRB
Yellow Warbler	*Dendroica petechia*	PO	SRB
Magnolia Warbler	*D. magnolia*	PO	SRB
Cape May Marbler	*D. tigrina*	PO	SRB
Yellow-rumped Warbler	*D. coronata*	PO	SRB
Black-throated Green Warbler	*D. virens*	PO	SRB
Palm Warbler	*D. palmarum*	PO	SRB
Bay-breasted Warbler	*D. castanea*	PO	SRB
Blackpoll Warbler	*D. striata*	PO	SRB
Black-and-White Warbler	*Mniotilta varia*	PO	SRB

Table E-2 (continued). Provisional checklist of birds of the Greenstone Belt.

Common Name	**Scientific Name**	**Group***	**Status****
American Redstart	Setophaga ruticilla	PO	SRB
Ovenbird	Seiurus aurocapillus	PO	SRB
Northern Waterthrush	S. noveboracensis	PO	SRB
Connecticut Warbler	Oporornis agilis	PO	SRB
Mourning Warbler	O. philadelphia	PO	SRB
Common Yellowthroat	Geothlypis trichas	PO	SRB
Wilson's Warbler	Wilsonia pusilla	PO	SRB
Canada Warbler	W. canadensis	PO	SRB
Western Tanager	Piranga indoviciana	PO	SRB
Rose-breasted Grosbeak	Pheucticus ludovicianus	PO	SRB
American Tree Sparrow	Spizella arborea	PO	M
Chipping Sparrow	S. passerina	PO	SRB
Clay-colored Sparrow	S. pallida	PO	SRB
Vesper Sparrow	Pooecetes gramineus	PO	SRB
Savannah Sparrow	Passerculus sandwichensis	PO	SRB
Le Conte's Sparrow	Ammodramus leconteii	PO	SRB
Fox Sparrow	Passerella iliaca	PO	SRB
Song Sparrow	Melospiza melodia	PO	SRB
Lincoln's Sparrow	M. lincolnii	PO	SRB
Swamp Sparrow	Melospiza georgiana	PO	SRB
White-throated Sparrow	Zonotrichia albicollis	PO	SRB
White-crowned Sparrow	Z. leucophrys	PO	M
Harris' Sparrow	Z. querula	PO	M
Dark-eyed Junco	Junco hyemalis	PO	SRB
Lapland Longspur	Calcarius lapponicus	PO	M
Smith's Longspur	C. pictus	PO	M
Snow Bunting	Plectrophenax nivalis	PO	WV
Red-winged Blackbird	Agelaius phoeniceus	PO	SRB
Yellow-headed Blackbird	Xanthocephalus xanthocephalus	PO	SRB
Rusty Blackbird	Euphagus carolinus	PO	SRB
Common Grackle	Quiscalus quiscula	PO	SRB
Brown-headed Cowbird	Molothrus ater	PO	SRB
Pine Grosbeak	Pinicola enucleator	PO	WV
Purple Finch	Carpodacus purpureus	PO	SRB
Red Crossbill	Loxia curvirostra	PO	PRB
White-winged Crossbill	L. leucoptera	PO	PRB
Common Redpoll	Carduelis flammea	PO	PRB
Hoary Redpoll	C. hornemanni	PO	WV
Pine Siskin	C. pinus	PO	SRB
Evening Grosbeak	Coccothraustes vespertinus	PO	WV(PRB)
House Sparrow	Passer domesticus	PO	PRB

...page 5 Table E-2

* Group

WF = waterfowl and related species
RA = raptors
UG = upland game birds
CN = colonial nesters
PO = passerines and others

** Status

SV = summer visitant
SR = summer resident
B = breeding
PB = probably breeding
M = migrant
WR = winter resident
PR = permanent resident
H = hypothetical
S = straggler

Sources

1 Godfrey, W.E. 1986.
2 Robbins, C.S. et al. 1966.
3 Salt, W.R. and J.R. Salt. 1976.
4 SMDC. 1985.
5 Barber et al. 1975.

Table E-3. List of common and scientific names of mammals found in the Greenstone Belt.

Common	**Specific**
Masked shrew	*Sorex cinereus*
American water shrew	*S. palustris*
Arctic shrew	*S. arcticus*
Pygmy shrew	*Microsorex hoyi*
Little brown bat	*Myotis lucifugus*
Silver-haired bat	*Lasionycteris noctivigans*
Keen's myotis	*Myotis keenii*
Big brown bat	*Eptesicus fuscus*
Hoary bat	*Lasiurus cinereus*
Snowshoe hare	*Lepus americanus*
Least chipmunk	*Eutamias minimus*
Woodchuck	*Marmota monax*
Red squirrel	*Tamiasciurus hudsonicus*
Northern flying squirrel	*Glaucomys sabrinus*
Beaver	*Castor canadensis*
Deer mouse	*Peromyscus maniculatus*
Gapper's red-backed vole	*Clethrionomys gapperi*
Northern bog lemming	*Synaptomys borealis*
Heather vole	*Phenacomys intermedius*
Muskrat	*Ondatra zibethicus*
Meadow vole	*Microtus pennsylvanicus*
Norway rat	*Rattus norvegicus*
House mouse	*Mus musculus*
Meadow jumping mouse	*Zapus hudsonius*
American porcupine	*Erethizon dorsatum*
Coyote	*Canis latrans*
Gray wolf	*C. lupus*
Red fox	*Vulpes vulpes*
Black bear	*Ursus americanus*
Raccoon	*Procyon lotor*
Marten	*Martes americana*
Fisher	*M. pennati*
Ermine	*Mustela erminea*
Least weasel	*M. nivalis*
American mink	*M. vison*
Wolverine	*Gulo gulo*
Striped skunk	*Mephitis mephitis*
River otter	*Lutra canadensis*
Lynx	*Lynx lynx*
Barren ground Caribou	*Rangifer tarandus groenlandicus*
Woodland caribou	*R. tarandus caribou*
Mule deer	*Odocoileus hemionus*
White-tailed deer	*O. virginianus*
Moose	*Alces alces*

Table E-4. Sport harvest of economically important species of wildlife for the La Rong Greenstone Belt, 1976-85.

	Moose		Woodland Caribou		Black Bear		Ruffed Grouse		Spruce Grouse		Water-fowl	
Year	Kill	Hunter Days	Kill	Hunter Days	Kill	Hunter Days	Kill	Hunter Days	Kill	Hunter Days	Kill	Hunter Days
1976	77	825	3	180	8	220	0	6	57	6	82	21
1977	164	976	0	61	23	291	241	81	79	81	27	12
1978	121	934	0	67	24	189	0	0	32	23	0	0
1979	76	644	0	4	10	55	0	72	0	72	526	65
1980	142	774	5	27	19	393	163	83	50	83	258	69
1981	7	520	6	96	14	300	43	152	138	152	352	85
1982	8	244	14	58	0	0	75	58	N/A	N/A	177	19
1983	15	321	11	64	24	81	135	140	N/A	N/A	693	166
1984*	19	272	0	34	N/A	N/A	175	190	58	190	13	298
1985*	15	659	8	28	20	237	235	238	473	238	670	178

* Data based on New Game Management Zones 71,72, and 74. Prior to 1984 all data based o Management Zone 36.

Table E-5. Moose Population Density Estimates from Aerial Surveys conducted within Greenstone Belt, 1973-84.

Survey Block	Size km^2	Date mm/yy	*Survey Type	Density Estimate Moose/km^2
Churchill 1	144	12/73	T	0.29
Churchill 2	83	12/73	T	0.12
Churchill 3	83	12/73	T	0.01
Churchill 6	91	12/73	T	0.13
Churchill 9	69	12/73	T	0.23
Churchill 10	137	12/73	T	0.28
Nagle Lake	828	12/74	T	<0.01
Star Lake	280	01/84	T	0.00
	280	01/84	SR	0.00
Waddy Lake	576	01/84	T	0.00
	576	01/84	SR	<0.01

* T = Linear Transect
SR = Stratified Random Quadrat

Source: Barber et al. 1975. Churchill River Study; SMDC 1985. Star Lake, Waddy Lake; SPRR Nagle Lake. (Unpublished Files, Regina).

Table E-6. Northern Fur Conservation Area Size, Total Members and Active Trappers 1985-86.

		No. of Trappers (85-86)	
Block	Area (sq. mi.)	Total Members	Active Trappers
N-5	2730 (707,092ha)	70	61
N-6	1580 (409,233ha)	67	58
N-7	1580 (348,107ha)	55	47
*N-8	1950 (505,066ha)	33	24
N-9	5600 (1,450,445ha)	206	189
N-10	5600 1,450,445ha)	84	67
*N-11	1960 (507,656ha)	38	26
*N-71	700 (181,306ha)	48	34
*N-74	1140 (295,269ha)	68	46
*N-79	2500 (647,520ha)	21	19

* 1974-75 Data

Table E-7. Fur harvest statistics for Northern Fur Conservation Area N-5, Pipestone 1976-86.

Year	Beaver	Coyote	Fisher	Fox	Lynx	Marten	Mink	Muskrat	Otter	Squirrel	Weasel	Other*
1976-77	407	22	36	3	21	6	419	646	26	2551	371	6,2,0
1977-78	400	5	10	9	31	3	220	1183	17	823	133	0,1,0
1978-79	481	7	39	26	53	26	287	1820	31	1831	216	7,7,0
1979-80	652	18	75	42	41	26	414	2216	33	3806	168	7,0,0
1980-81	530	22	92	100	46	22	366	1852	35	3192	203	2,6,0
1981-82	202	41	86	71	22	35	211	767	17	1114	78	1,6,1
1982-83	281	14	135	47	24	45	276	983	20	1394	165	5,5,0
1983-84	308	9	115	25	4	65	217	1949	20	1019	284	5,4,0
1984-85	380	12	66	37	9	39	170	1607	19	1177	334	10,1
1985-86	329	7	62	27	5	59	324	1220	46	1546	240	5,2,1
AVERAGE	397	16	72	39	26	33	290	1424	26	1845	219	4.8,3.4,0.2

AVERAGE ANNUAL TOTAL VALUE = $49,630.82

* Presented as Bear, Wolf, Wolverine.

Table E-8. Fur harvest statistics for Northern Fur Conservation Area N-8, Churchill/Foste 1976-86.

Year	Beaver	Coyote	Fisher	Fox	Lynx	Marten	Mink	Muskrat	Otter	Squirrel	Weasel	Other*
1976-77	278	0	12	46	68	0	286	326	19	693	145	2,2
1977-78	168	8	14	245	120	0	307	1158	28	418	63	3
1978-79	457	7	36	344	101	0	452	755	21	408	63	7,1
1979-80	497	8	55	210	44	0	312	984	18	1283	72	0,2,3
1980-81	371	4	61	224	22	2	220	816	39	940	166	6,2,1
1981-82	159	8	96	125	19	1	88	361	25	477	76	1,4
1982-83	243	22	121	97	12	2	224	503	19	462	89	8,2
1983-84	206	5	94	108	36	4	272	947	34	682	164	5,3,4
1984-85	223	8	89	82	23	5	190	358	22	249	191	5,5,1
1985-86	247	8	104	94	12	1	341	388	44	626	142	5,1,1
AVERAGE	285	8	68	158	46	2	269	660	27	624	117	4.2,2.0,0.7

AVERAGE ANNUAL TOTAL VALUE = $55,138.96

* Presented as Bear, Wolf, Wolverine.

Table E-9. Fur harvest statistics for Northern Fur Conservation Area N-9, Stanley Mission 1976-86.

Year	Beaver	Coyote	Fisher	Fox	Lynx	Marten	Mink	Muskrat	Otter	Squirrel	Weasel	Other*
1976-77	1394	3	65	81	201	2	1088	2145	70	5785	571	22,6,0
1977-78	1277	12	69	323	317	0	906	3447	96	1913	364	2,0,2
1978-79	2095	10	178	723	329	13	1831	5203	137	3755	311	17,9,1
1979-80	2667	19	285	713	211	19	1424	5869	124	7796	439	18,9,1
1980-81	2764	21	366	671	127	11	963	5879	126	6636	853	18,12,7
1981-82	1231	29	412	344	46	21	602	3440	82	3248	442	3,10,2
1982-83	1204	16	433	136	47	12	854	3511	75	3132	406	12,2,2
1983-84	1124	12	355	106	38	15	1052	4206	91	3139	601	27,7,0
1984-85	1258	10	248	111	32	14	919	4348	77	1778	690	17,9,2
1985-86	1545	2	242	149	27	46	1134	2202	212	4045	601	16,6,3
AVERAGE	1656	13	265	336	138	15	1077	4025	109	4123	528	15,7,2

AVERAGE ANNUAL TOTAL VALUE = $169,105.67

* Presented as Bear, Wolf, Wolverine.

Table E-10. Fur harvest statistics for Northern Fur Conservation Area N-10, Southend 1976-86.

Year	Beaver	Coyote	Fisher	Fox	Lynx	Marten	Mink	Muskrat	Otter	Squirrel	Weasel	Other*
1976-77	321	0	7	72	196	0	260	143	52	517	108	5,7,0
1977-78	434	0	17	232	202	4	353	1358	74	202	50	1,2,0
1978-79	504	1	20	420	155	11	514	665	73	525	61	5,1,0
1979-80	601	1	60	515	79	6	350	518	73	714	45	4,1,0
1980-81	528	4	50	568	33	11	139	377	58	773	122	1,3,0
1981-82	269	5	77	323	18	24	89	201	30	399	113	1,10,1
1982-83	240	1	89	121	9	19	101	209	21	353	84	0,4,1
1983-84	215	4	78	86	24	17	254	424	40	379	118	0,3,3
1984-85	261	1	92	83	24	49	242	407	37	225	235	0,2,2
1985-86	286	6	160	123	43	87	809	117	75	409	211	3,7,4
AVERAGE	366	2	65	254	78	23	311	442	53	450	115	2,4,1.1

AVERAGE ANNUAL TOTAL VALUE = $68,521.71

* Presented as Bear, Wolf, Wolverine.

Table E-11. Fur harvest statistics for Northern Fur Conservation Area N-6, Little Hills 1976-86.

Year	Beaver	Coyote	Fisher	Fox	Lynx	Marten	Mink	Muskrat	Otter	Squirrel	Weasel	Other*
1976-77	210	4	38	7	16	1	340	1749	10	2127	321	3,4,0
1977-78	327	7	19	4	37	0	223	2254	21	1285	120	4,3,0
1978-79	324	19	41	26	37	3	300	2593	34	2558	320	4,4,0
1979-80	485	29	107	79	38	8	314	5216	26	4986	270	5,5,0
1980-81	374	33	144	110	31	1	170	5957	26	3537	266	6,3,0
1981-82	259	20	129	63	19	3	147	3858	27	1344	132	6,4,0
1982-83	262	16	162	41	20	10	141	5161	32	1163	129	5,0,1
1983-84	118	6	125	37	16	13	196	3966	30	1074	239	2,3,0
1984-85	369	11	101	29	7	8	178	3570	40	1254	225	6,3,0
1985-86	341	3	78	22	0	7	187	4660	39	1348	262	4,4,0
AVERAGE	307	15	94	42	22	5	220	3898	29	2068	228	4.5,3.3,0.1

AVERAGE ANNUAL TOTAL VALUE = $54,296.68

* Presented as Bear, Wolf, Wolverine.

Table E-12. Fur harvest statistics for Northern Fur Conservation Area N-7, Sucker River 1976-86.

Year	Beaver	Coyote	Fisher	Fox	Lynx	Marten	Mink	Muskrat	Otter	Squirrel	Weasel	Other*
1976-77	494	3	9	6	20	0	351	475	5	1714	280	6,1,0
1977-78	352	7	23	24	41	0	257	655	16	1211	140	2,1,0
1978-79	498	18	41	47	22	2	414	1573	29	2034	149	4,3,4
1979-80	623	16	79	66	28	1	401	1291	23	2484	168	5,2,0
1980-81	630	13	88	52	6	3	207	2131	16	2253	198	11,6,0
1981-82	197	23	88	82	11	2	123	967	11	808	72	7,2,1
1982-83	120	11	105	47	13	5	223	995	19	1190	145	2,0,0
1983-84	273	11	107	30	14	3	276	970	15	815	231	17,0,2
1984-85	452	12	72	22	22	6	179	1042	32	833	181	6,3,1
1985-86	385	7	75	39	2	6	309	525	45	1068	174	10,2,0
AVERAGE	402	12	69	42	18	3	274	1062	21	1441	174	7.0,2.0,0.8

AVERAGE ANNUAL TOTAL VALUE = $43,536.63

* Presented as Bear, Wolf, Wolverine.

Table E-13. Fur harvest statistics for Northern Fur Conservation Area N-11, Pinehouse 1976-86.

Year	Beaver	Coyote	Fisher	Fox	Lynx	Marten	Mink	Muskrat	Otter	Squirrel	Weasel	Other*
1976-77	270	2	11	8	51	0	325	1306	21	590	206	0,0,0
1977-78	290	2	6	12	119	1	208	2239	17	354	89	0,0,0
1978-79	415	7	15	31	40	7	384	3006	27	571	137	0,0,0
1979-80	476	34	47	98	17	0	348	5754	19	1290	180	0,0,0
1980-81	532	33	27	107	18	0	136	6011	25	1120	160	0,0,0
1981-82	100	32	31	127	15	0	46	1299	11	420	50	0,0,0
1982-83	255	18	72	93	24	2	121	2166	21	290	83	0,0,0
1983-84	256	31	71	63	30	0	131	2332	27	494	212	0,0,0
1984-85	200	24	55	43	16	4	164	1046	21	507	217	8,3,1
1985-86	297	25	57	58	10	2	201	1786	42	586	167	0,0,0
AVERAGE	309	21	39	64	34	2	209	2695	23	622	150	0.8,0.3,0.1

AVERAGE ANNUAL TOTAL VALUE = $48,792.20

* Presented as Bear, Wolf, Wolverine.

Table E-14. Fur harvest statistics for Northern Fur Conservation Area N-71, Sandy Narrows 1976-86.

Year	Beaver	Coyote	Fisher	Fox	Lynx	Marten	Mink	Muskrat	Otter	Squirrel	Weasel	Other*
1976-77	385	0	16	4	19	2	155	584	14	693	152	0,2,0
1977-78	320	1	12	8	46	5	174	1089	16	163	74	1,1,0
1978-79	473	0	25	14	32	6	321	1706	21	254	77	2,0,0
1979-80	593	1	61	43	36	10	354	1070	39	1029	65	3,0,0
1980-81	366	5	125	38	15	10	178	1979	5	709	83	5,2,0
1981-82	254	8	140	57	12	11	94	473	6	448	106	0,1,0
1982-83	277	5	116	20	12	18	152	867	15	427	102	0,3,0
1983-84	104	1	90	18	9	9	86	1627	17	200	143	1,0,0
1984-85	196	1	48	8	2	8	131	1667	14	188	125	4,3,0
1985-86	210	0	60	21	16	19	226	319	42	293	65	3,2,0
AVERAGE	318	2	69	23	20	10	187	1138	19	440	99	1.9,1.4,0

AVERAGE ANNUAL TOTAL VALUE = $31,201.92

* Presented as Bear, Wolf, Wolverine.

Table E-15. Fur harvest statistics for Northern Fur Conservation Area N-74, Two Rivers 1976-86.

Year	Beaver	Coyote	Fisher	Fox	Lynx	Marten	Mink	Muskrat	Otter	Squirrel	Weasel	Other*
1976-77	785	0	9	14	129	0	166	466	26	613	77	0,1,0
1977-78	727	0	8	41	151	0	206	1305	36	153	55	2,0,2
1978-79	1034	0	14	147	184	3	444	1481	47	125	29	4,4,0
1979-80	702	5	39	149	78	0	364	909	29	479	26	2,1,0
1980-81	737	3	85	139	49	2	208	1601	35	633	102	1,3,0
1981-82	400	5	116	103	14	1	90	1068	31	336	71	0,3,2
1982-83	328	8	163	72	24	4	168	912	38	318	70	2,8,1
1983-84	195	3	158	44	25	5	137	1241	34	208	122	4,0,0
1984-85	262	4	88	37	10	5	222	1030	13	316	248	5,3,2
1985-86	348	1	125	68	28	3	330	612	56	354	126	1,6,3
AVERAGE	552	3	81	81	69	2	234	1063	35	354	93	1.6,2.9,1.0

AVERAGE ANNUAL TOTAL VALUE = $57,390.68

* Presented as Bear, Wolf, Wolverine.

Table E-16. Fur harvest statistics for Northern Fur Conservation Area N-79, Fish River 1976-86.

Year	Beaver	Coyote	Fisher	Fox	Lynx	Marten	Mink	Muskrat	Otter	Squirrel	Weasel	Other*
1976-77	291	0	2	41	108	2	201	348	17	1145	159	8,4,1
1977-78	214	6	3	113	105	0	173	422	10	550	57	2,2,2
1978-79	244	8	5	147	43	2	210	510	14	428	42	2,2,1
1979-80	337	8	14	129	32	0	179	712	6	735	32	7,3,3
1980-81	261	9	27	181	39	4	146	899	10	418	58	2,0,1
1981-82	114	5	34	97	32	1	68	399	15	443	36	2,0,1
1982-83	89	3	30	71	34	0	96	515	10	330	69	2,2,5
1983-84	234	6	45	115	43	0	133	641	22	468	87	4,0,0
1984-85	176	6	19	63	8	0	113	190	13	196	71	3,0,0
1985-86	164	1	29	57	7	1	123	238	25	138	45	3,1,1
AVERAGE	212	5	21	101	45	1	144	487	14	485	66	3.5,1.4,1.4

AVERAGE ANNUAL TOTAL VALUE = $35,327.14

* Presented as Bear, Wolf, Wolverine.

APPENDIX E-2. FIGURES

APPENDIX E-2. FIGURES

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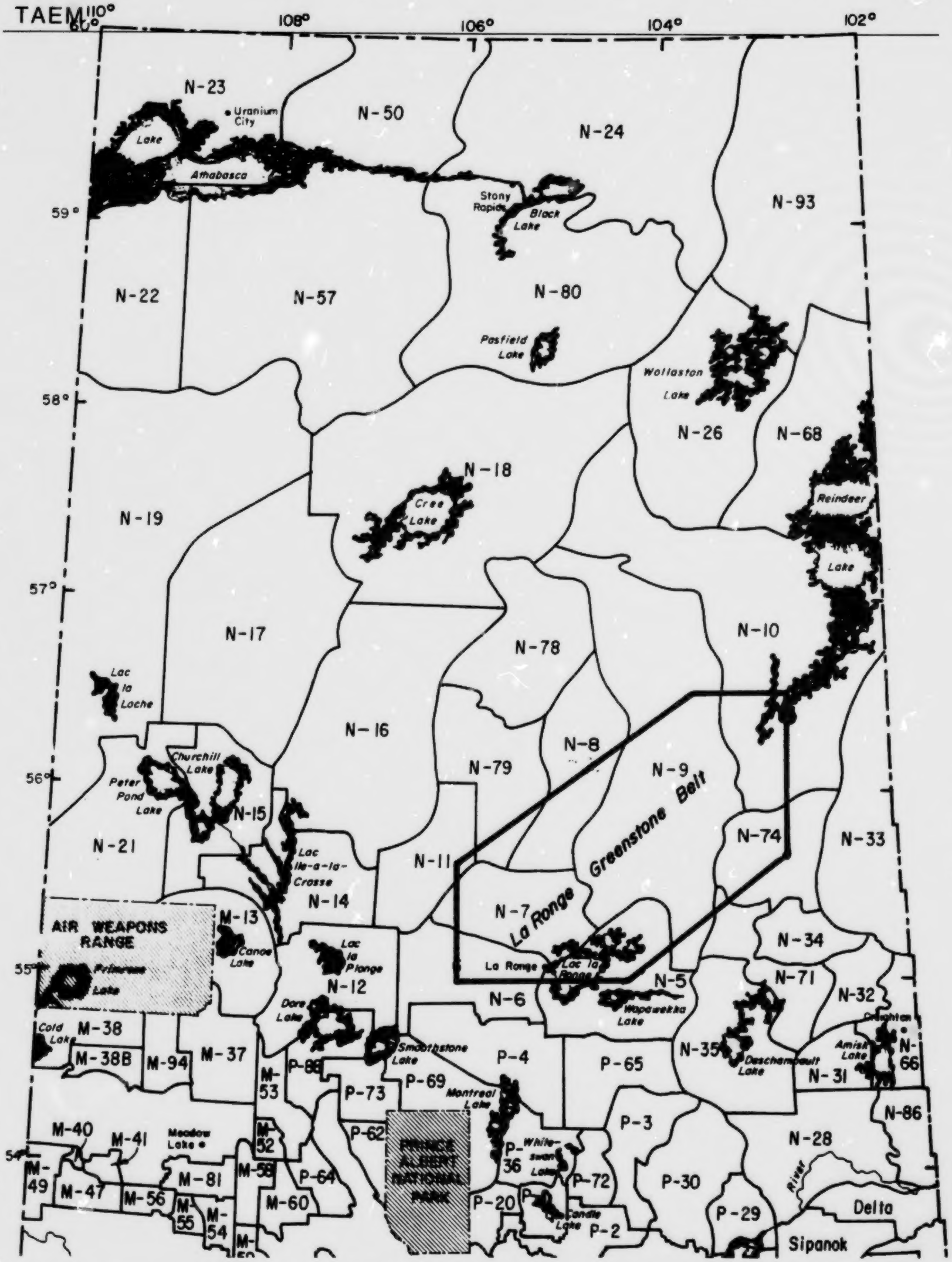
Figure E-1. Locations of Northern Fur Conservation Areas in relation to the La Ronge Greenstone Belt.


TAEM
110°
60°
108°
106°
104°
102°
59°
58°
57°
56°
55°
54°
N-23
Uranium City
Lake
Athabasca
N-50
N-24
Stony Rapids
Black Lake
N-93
N-22
N-57
N-80
Pasfield Lake
Wollaston Lake
N-26
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Cree Lake
Reindeer
Lake
N-19
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Lac la Loche
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Churchill Lake
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N-33
N-14
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AIR WEAPONS RANGE
Primrose Lake
Canoe Lake
Lac la Plonge
La Ronge
Lac la Ronge
N-34
N-5
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N-32
N-12
Dore Lake
N-6
Wapawekka Lake
Creighton
Cold Lake
M-38
M-38B
M-94
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Smoothstone Lake
P-4
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N-35
Deschambault Lake
Amisk Lake
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River
M-55
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Sipanok

Figure E-1. Locations of Northern Fur Conservation Areas in relation to the La Ronge Greenstone Belt.

SECTION F
WATER

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1.0 INTRODUCTION

This section addresses available information related to the aquatic resources of the La Ronge Greenstone Belt. It includes available data on surface hydrology, water quality and aquatic biology.

The potential exists for impacts to the aquatic resources resulting from mining developments in the La Ronge Greenstone Belt. Alterations in existing water quality could occur related to the release of effluent from milling operations, tailing handling procedures, run-off, sewage, groundwater de-watering and other sources of waste water release. Alterations in water quality (or quantity) could reflect on the suitability of the aquatic resource as habitat for the aquatic biological resources, such as fisheries. In addition, the loss or alteration of habitat, particularly critical habitat (such as spawning areas), by the physical modification of lakes and/or streams could have a direct impact on the aquatic biological resources of the area and their existing and potential utilization. Data indicate that these resources are utilized for commercial, recreational and subsistence uses.

2.0 SURFACE HYDROLOGY

2.1 Drainage

The La Ronge Greenstone Belt study area lies within the Churchill River Drainage Basin. The drainage pattern is strongly influenced by bedrock in the Precambrian Shield and lakes in the area are long, narrow, ragged and mostly parallel to the bedrock structure and ice flow direction which is generally northeast to southwest (Schreiner 1984). The drainage pattern is described as being trellis-like, with many rivers and streams having a northeast-southwest trend. Short streams generally are at right angles to the main flow and follow joint patterns or other weaknesses in the bedrock.

Perched bogs and muskegs are numerous but generally small in area.

Sub-basins in the study area are shown on Map F-1. The Churchill River Drainage Basin may be subdivided in the study area into two major basins: one collecting flow into the Churchill River and another collecting flow into the Reindeer Lake. Drainage basins within the area have been defined by Water Survey of Canada, with gauging stations shown on Map F-1 and described in Table F-1. Table F-1 also defines the drainage area for each gauging station. These drainage basins have also been subdivided into sub-basins where possible, on 1:250,000 scale maps. Table F-2 is a tabulation of measured discharges for gauging stations in the study area. Data include mean, maximum and minimum monthly discharges for the period of record, and maximum and minimum daily discharges for the period of record.

No information was found describing either seasonal cycles for the area or stage discharge. However, in general it can be stated that the median date of the first snow cover is approximately 31 October, with the median date of the last snow cover being approximately 20 April.

Hofer (1975) reports that on the Churchill River, the large number of lakes on the river modifies the stream flow pattern such that the April runoff from the melting snow is delayed by the routing effects of the on-channel lakes. As a result, the flood peak does not reach the Saskatchewan-Manitoba border until July or August.

Koshinsky (1971b) states that the discharge from the till component of the watershed for Trout Lake (Map F-2) averages approximately 0.18 cfs/sq. mile, while runoff from the Shield is considerably more rapid and approximately 0.40 cfs/sq. mile.

2.2 Freeze Up/Break Up

No recorded data were found regarding freeze up of lakes, although it is expected that the majority of the lakes would freeze in late October. Ice cover on the smaller lakes in the study area was found to experience break up during the interval from the last few days of April through the first two weeks of May. The majority of lakes observed in a study by Koshinsky (1968a) were open by 05 May or earlier in 1964, while break up occurred approximately five days earlier in 1965. The rate of freeze up and break up is dependent upon meteorological conditions and certain features of the lakes, such as depth and surface area (Koshinsky 1968a).

2.3 Morphometry and Other Data

Morphometry information and other data for lakes in the study area may be found in Technical Reports of the Fisheries Branch, Department of Parks and Renewable Resources, and other documents retained by that agency. Table F-3 lists the lakes in the study area that have been catalogued by Fisheries Branch, and the types of reference materials available for each lake.

With respect to morphometry, data indicate the wide variety of shapes, depths and sizes of lakes in the study area.

2.4 Surface Water Users

Records for surface water users are kept by the Saskatchewan Water Corporation. Five surface water users were identified. The users and other information, defined below, are tabulated in Table F-4:

1. Allocation: reflects the consumptive use of a development in cubic decametres.
2. Diversion: reflects the total depletion (allocation + losses) of a development in cubic decametres.
3. Class: describes whether the source of the supply for a project acts as a main or backup supply.
4. Supply: describes the source of supply for the system.
5. Type: classifies projects.

3.0 SURFACE WATER QUALITY

The majority of surface water quality information for bodies of water in the study area is available from reports of the Saskatchewan Fisheries Laboratory, Department of Parks and Renewable Resources (Table F-3). Additional data for areas surrounding development sites are available from Saskatchewan Environment and Public Safety. Data are also available from Health and Welfare Canada from groundwater and surface water sampling for coliforms, nitrates, sulfates and mineral content of water for human consumption. Table F-5 is a tabulation of surface water quality data. Data presented include conductivity, alkalinity, total dissolved solids, pH, and major ion analyses. Additional information on water quality, which includes analyses for metals and trace constituents, is shown in Table F-6. Technical Reports available also contain additional information regarding dissolved oxygen and temperature profiles.

In general, surface water quality is good, with surface pH generally neutral to basic (7.0 to 8.3) and bottom pH generally acidic (6.4 to 8.3). Total dissolved solids is generally low, less than 135 mg/l and commonly averaging less than 50 mg/l. Dominant cations are bicarbonates and chlorides, while the dominant anions are commonly calcium, magnesium and sodium. Where analyses for heavy metals were conducted, most heavy metal concentrations are below the detection limits, with the exception of iron. Figures F-1 to F-4 are trilinear diagrams illustrating typical water qualities of Churchill River lakes, Reindeer River lakes and other groups of lakes in the study area.

In general, the chemistry of the surface water is related to the local geology and drainage. Where drainage occurs predominantly from areas of insoluble surficial bedrock of the Shield, the surface water has lower total dissolved solids, generally less than 50 mg/l. When considerable drainage occurs from areas with till, higher total dissolved solids are generally observed. Lakes for which sediment data are available are found in Table F-7.

In a study conducted by Liaw and Atton (1981), 71 percent of 300 waters examined in the northern Precambrian region had alkalinities of 20 mg/l or less and were considered sensitive to environmental change, in particular acidification because of the inability of the lake water to neutralize hydrogen ions. Muskegs were found to have variable chemistry. Davis (1976) reports that pH values for samples of muskeg leachate ranged from 4.6 to just over 7. The specific conductivity of the samples ranged from approximately 20 to 140 umhos/cm. Values of total dissolved solids ranged from 40 to 221 mg/l. In eight muskegs and two small muskeg lakes along the Stanley Mission Road north of Lac la Ronge, and eight muskegs and three muskeg lakes along Highway 105 between Southend and the Johnson River (Liaw and Atton 1981), the pH varied from very acidic (pH 3.90) to neutral (pH 7.05), with a mode of 5.95 and a mean of 4.77. The alkalinity of the muskegs near Stanley Mission varied from nil to 15.5 mg/l, with a mean of 4.4 mg/l. The group of muskegs along Highway 105 was higher in alkalinity and lower in acidity by comparison, with an average alkalinity of 7.4 mg/l.

Calcium and magnesium concentrations in the muskeg waters were generally within the normal ranges found in lakes in northern Saskatchewan, with calcium concentrations ranging from <1 mg/l to 10 mg/l, and magnesium concentrations of <1 mg/l to 3 mg/l. However, the concentration of total aluminum was high, ranging from <0.20 mg/l to 1.05 mg/l. At the outlet of Reindeer Lake, the concentration of total aluminum was measured at 0.1 mg/l (Liaw and Atton 1981).

4.0 AQUATIC BIOLOGY

4.1 Introduction

4.1.1 Background

This section presents the available information on the aquatic biological resources of the La Ronge Greenstone Belt. Emphasis of this review was placed on the fish resources of the area, as this is a renewable resource important to the recreaticnal, commercial and domestic/subsistence fishery. In addition, the utilization and well-being of this resource can be threatened during various different of mineral extraction. This review also addresses the other components of the aquatic biological resource including aquatic macrophytes (plants), benthic invertebrates and plankton. These components are important ecological elements that play an integral role in maintaining the quality of aquatic habitat, as it relates to the fish resources and the utilization of the aquatic resource by the public.

The hydrology of the La Ronge Greenstone Belt has been previously described (see Section F, 1.0). In the following review, the study area was divided, for convenience of presentation, into two main drainages within the study area, and a number of sub-drainages. As seen in Map F-2, these drainages were named as follows:

1. Reindeer River
    - Hickson Lake
    - Numabin Bay
    - Harriott River
    - Wapiskaw/Reindeer River

2. Churchill River
   - Foster River
   - Black Bear Island Lake
   - Otter Lake
   - Nemeiben Lake
   - Montreal River
   - Lac la Ronge
   - Keg Lake

The available data presented below were assimilated from published and unpublished reports, a review of government files and unpublished reports made available by Saskatchewan Parks and Renewable Resources (SPRR), a review of available private sector reports, contact with numerous officials, and a computer assisted search on the National Resource Council's CAN/OLE databases. Emphasis of this review was placed on the sport and commercial fish species, although, where information was available, data were collected on aquatic plants, benthic invertebrates and plankton.

4.1.2 Aquatic Habitat Characteristics

The study area consists of a large number of lakes and streams of the Precambrian Shield, many of which provide suitable aquatic habitat for a variety of fish species. Koshinsky (1970) describes the lakes of this region as ice-scour basins of glacial origin. Small lakes are typically U-shaped while larger lakes become progressively less J-shaped. Numerous islands are characteristic of Precambrian Shield lakes with their occurrence related to the surface areas of the lake basins (Koshinsky 1970).

Four lake habitat types have been described for the Precambrian Shield (TAEM 1986 and others) as follows.

1. Boggy Headwater Lakes

These are generally small and poorly drained lakes surrounded by bog habitat. The outflow channel may be poorly defined. They are usually slightly acidic, brown in color and are generally of low productivity. Fish production is usually limited or can be absent in those of shallow depth (<3-5 m). Where fish occur, species diversity is low, with northern pike usually the only game fish found.

2. Rocky Headwater Lakes

These are generally larger and deeper lakes with much of the shoreline consisting of a boulder and cobble substrate. Shoreline development is greater and islands become more common. Being a headwater lake, the outflow channel is usually well defined. These lakes support a greater productivity level than boggy lakes. They are usually capable of supporting northern pike and lake whitefish, and depending on the size and depth of the lake, may also support a walleye and/or lake trout population. Some minnows and coarse fish species may also be found.

3. Riverine Lakes

These are formed by a widening of the main stream channel, and usually occur in the middle to lower reaches of watersheds.

Biological activity may be increased due to elevated levels of allochthonous input (various forms of matter entering the system such as organic materials). Fish species diversity is usually increased with various minnow and coarse fish species present. Depending on conditions, northern pike, lake whitefish, walleye and other sport and commercial fish species may be found.

4. Receiving Bay

This habitat is more typical of large lakes where a watershed discharges into the lake. This habitat tends to be more productive, supporting a diversity of fish species.

Stream habitat reflects many of the chemical and biological characteristics of the lakes they drain. Streams draining boggy lake habitat are generally slow moving and often have a poorly defined channel. Bottom substrate is usually of organic material.

Streams draining rocky headwater lakes and riverine lakes are varied depending on local topographic relief. They are generally composed of pool and riffle areas which are important to supporting critical fish habitat such as spawning, rearing, feeding and over-wintering. Bottom substrate can vary from sand and silt to cobble and boulders.

4.1.3 Available Data

The study area is comprised of hundreds of lakes and streams for which little to no information on the aquatic biological resources is available. However, the many waterbodies for which data are available provide a good baseline to characterize the aquatic biological resources of the area.

Waterbodies for which at least some data are available are listed in Table F-7. Most data are available for lakes which have either been investigated by provincial government agencies, are commercially or recreationally fished, or have been studied in relation to specific northern development projects. The locations of these lakes are illustrated on Map F-2.

4.2 Fish Resources

4.2.1 Species Composition

A list of fish species found in the study area is presented in Table F-8. A list of waterbodies and fish species known to occur in them is found in Table F-9. From this table it is apparent that northern pike, lake whitefish, walleye and lake trout are widely distributed throughout each of the drainage basins. Other species including round whitefish, yellow perch, lake cisco and burbot are also found. A number of course and forage fish species are found. Arctic grayling, a species found mainly in the MacKenzie Drainage Basin, has been introduced to several lakes in the study area. Rainbow trout, brook trout and splake have also been stocked in some lakes. No information was found on any rare or endangered fish species in the study area.

Of the important sport and commercial fish species found, northern pike, lake whitefish, lake trout and walleye are common within each of the drainage systems. Of these species, only lake trout are usually restricted to a lake habitat, all other species can be found in both lake and stream habitats.

4.2.2 Relative Abundance

Tables F-10 and F-11 give an indication of the relative abundance of the important sport and commercial fish species found in the study area. The least numerous species are arctic grayling, rainbow trout, brook trout and splake, but this is expected given that these are stocked and introduced species (natural grayling populations are rare in the study area).

Commercial catch records (Table F-11) indicate that lake whitefish are the most abundant of the important commercial fish species found. Next, in order of abundance, are lake trout, walleye and northern pike. Although these data may reflect the relative abundance of these species in larger systems, it must be noted that these species are selectively fished and catch records often reflect market conditions for particular fish species.

Unpublished recreational fish harvest, as reported by fish camp outfitters in the La Ronge Greenstone belt, indicate that walleye and northern pike are the two most common fish caught, while lake trout are a distant third. All other species reported are caught in low numbers.

4.2.3 Utilization of the Fish Resource

A commercial fishery and a fish camp outfitter recreational fishery comprise the main utilization of the fish resources in the general study area. Domestic fishing is also found.

Table F-11 summarizes the commercial fish records for the study area by the average weight by species caught for the last five years fished, the number of licenses issued in the last year fished and the period of record. These commercial records show that lake whitefish, lake trout, walleye and northern pike are the important commercial fish species captured. In general, only the larger lakes support a sustained commercial fishery.

Table F-7 summarizes the use of lakes in the study area for recreational fishing provided by northern fish camp outfitters. Unpublished reports indicate that walleye, northern pike and lake trout are the species most often caught.

Recreational fishing, unattended by fish camp outfitters is indicated by locations of campgrounds (Table F-7). Offal count data provided by SPRR indicate that northern pike and walleye are the two species most often caught.

No data are available on the domestic/subsistence fishery within the study area.

4.2.4 Sensitivities

The fish resources of the study area are considered an important renewable resource to the public, as well as being an important food resource to some mammals and birds. As mineral extraction has the potential to impact on this resource, this section briefly reviews the critical habitats and sensitivity of the important sport and commercial fish species found in the study area.

The biological sensitivity of fish to disturbance can be both spatial and temporal in nature. Spatial sensitivities reflect impacts to habitats utilized by a particular species that ensures its survival and sustained recruitment. Temporal sensitivities reflect seasonal critical periods, in particular migration, spawning and early fry development. These sensitivities are summarized for the important sport and commercial fish species in Table F-12.

Four habitats are considered as critical to the maintenance of fish populations.

1. Spawning
   Both spring and fall spawning fish species utilize specific spawning habitat types as dictated by physical characteristics (current, substrate, depth, etc). Alterations in spawning habitat will reflect on spawning success and subsequent recruitment.
2. Rearing
   This habitat is used by newly hatched fry and juvenile fish during early development. Shelter from predation, specific food requirements and certain water quality requirements dictate the quality of this habitat.
3. Wintering
   Fish usually over-winter in lakes, larger rivers and deep holes in smaller streams. Basic requirements include an adequate water, oxygen and food supply.
4. Migration
   Migration routes that permit fish access to critical habitat.

The characteristics of critical habitat for the important sport and commercial fish species found in the study area have been reviewed by many authors. A brief description of these habitats follows.

Northern Pike

The spawning habitat of northern pike has been well documented and has been reviewed extensively (Scott and Crossman 1973, Robertson 1969, Toner 1966 and others). In brief, northern pike migrate into streams or inshore areas of lakes in the spring as soon as ice has melted sufficiently to permit fish movement. Northern pike spawn on heavily vegetated flood plains of rivers, marshes and bays of lakes. They usually spawn in shallow (<1 m) still water (Koshinsky 1979). Spawned eggs attach to aquatic vegetation where they hatch after 12 to 14 days. Juvenile fish utilize shallow inshore areas as rearing habitat (Chapman and MacKay 1984). Adult fish are usually found within the top 1-5 m of water near shore, most often in areas supporting aquatic vegetation.

Walleye

Walleye are spring spawners, migrating to spawning grounds usually after ice break-up. Walleye spawn in shallow water (<1.5 m) at the base of water falls and rapids or on shoals or shorelines of lakes where water movement or wave action provides a good supply of oxygen (Chevalier 1977, Busch et al. 1975). Preferred spawning substrates include gravel, rubble, boulders, sand, marsh vegetation and firm muck, in order of preference (Johnson 1961, Machniak 1975 in Chen 1980). Following stream spawning, adult walleye often return to littoral zones of lakes or quieter sections of rivers. Extensive migrations to spawning, summer and over-winter habitats have been reported for this species (Bidgood 1968, Integrated Environmental Services Inc. 1986c).

Lake Whitefish

Lake whitefish are generally abundant in lakes in northern Saskatchewan. They are also found in the quieter stretches of larger rivers. As bottom feeders, they descend to the cooler waters of the hypolimnion during summer months, where dissolved oxygen concentrations permit.

Lake whitefish are fall spawners, likely spawning in the study area about late October (TAEM 1986 unpublished data, Integrated Environmental Sciences 1985c, Dean 1976). Lake whitefish usually spawn in lakes in water depths of less than 3 m over rock, boulder, gravel or sand bottom. They have also been reported to spawn on a silt or mud bottom, although the percent hatch is usually reduced (Ash 1974). Fertilized lake whitefish eggs incubate over the winter months, hatching in late winter-early spring. Young lake whitefish are often found in shallow water at depths of 1 to 3 m (Hoagman 1973), although distribution is usually sporadic. As water temperature increases, they move to cooler water in the metalimnion (Reckhan 1970).

Lake whitefish usually over-winter in lakes, although they may be found in larger rivers.

Lake Trout

Lake trout are typically found in large, deep, cold lakes that support adequate hypolimnetic dissolved oxygen levels. Although typically found in lakes, they are occasionally found in large rivers (e.g. Waterfound River in TAEM 1986). During summer months, lake trout move to cooler hypolimnetic water of lakes.

Lake trout are fall spawners, usually spawning about mid-September to mid-October in the study area (Johnson 1971, TAEM 1986). Spawning usually occurs over rock and boulder bottom substrate near shores or on shoals of lakes (Johnson 1971, Scott and Crossman 1973, Chen 1979a). Spawning depths can range from 0.3 to 12 m. Following spawning, eggs incubate for a period of 4 to 5 months, hatching under the ice. Fry remain in shallow inshore areas, but move to greater depths by late summer.

Lake trout over-winter in lakes and only occasionally use rivers as migration routes to spawning habitat.

4.3 Other

Data were also collected for other components of the aquatic environment including aquatic plants, benthic invertebrates and zoo- and phytoplankton.

4.3.1 Aquatic Plants

Aquatic plants play an important ecological role in an aquatic ecosystem such as the uptake of nutrients from the lake bottom substrate and from lake water itself. In addition, aquatic plants are important to fish habitat for spawning and as shelter for juvenile and adult fish.

A list of waterbodies for which aquatic plant data have been collected is found in Table F-7. A species list of common aquatic and semi-aquatic plants found in the La Ronge Greenstone Belt is presented in Table F-13.

4.3.2 Benthic Invertebrates

Benthic invertebrates are an important food of many fish species, including lake whitefish. In addition, they are a useful tool in the monitoring of impacts of change in water quality due to some forms of perturbation (such as the introduction of effluent). These organisms exhibit varying degrees of sensitivity to inputs.

A list of waterbodies from which benthic invertebrate populations have been documented are reported in Table F-7. A general species list of organisms collected in the study area is reported in Table F-14.

4.3.3 Plankton

Zooplankton and phytoplankton play an integral role in the ecology of an aquatic ecosystem. As such, they are useful in characterizing the trophic status and productivity level of an aquatic ecosystem. A list of waterbodies from which plankton samples have previously been collected in the study area is found in Table F-7. A general species list is presented in Tables F-15 and F-16.

5.0 BIBLIOGRAPHY

Arnold, R.G. 1970. The concentrations of metals in the lake waters and sediments of some Precambrian lakes in the Flin Flon and La Ronge areas. SRC, Geology Division, Circular 4.

Ash, G.R. 1974. The effects of heated water discharge upon lake whitefish (Coregonus clupeaformis, Mitchell) in Wabamun Lake, Alberta. M.Sc. Thesis. Univ. of Alberta.

Atton, F.M. 1952. Lac la Ronge creel census, 1951. SPRR, Fisheries Branch, Report 52-4.

Atton, F.M. 1955. Thermal studies of Lac la Ronge, 1949-52. Thesis, University of Saskatchewan.

Atton, F.M. 1959. Lac la Ronge creel census, 1958. SPRR, Fisheries Branch, Report 59-9.

Atton, F.M. 1963. Lac la Ronge creel census, 1962. SPRR, Fisheries Branch, Report 63-4.

Atton, F.M. 1964. Lac la Ronge creel census, 1963. SPRR, Fisheries Branch, Report 64-7.

Atton, F.M. 1969. Fish, Amphibians and Reptiles. In: Atlas of Saskatchewan. J.H. Richards and K.I. Fung (eds). University of Saskatchewan. 84p.

Atton, F.M. 1974. Impact Analysis. Hindsight and Foresight in Saskatchewan. Churchill River Study (Missinippi Probe).

Atton, F.M., R.P. Johnson, & N.W. Smith. 1975. Bibliography of limnology and aquatic fauna and flora of Saskatchewan. SPRR, Fisheries Branch, Report 10: 1-33.

Atton, F.M. 1983. Atlas of Saskatchewan Fish. SPRR Technical Report 83-2. 281pp.

Atton, F.M. and J.J. Merkowsky. 1983. Atlas of Sask. Fish. SPRR, Fisheries Branch, Report 83-2.

Beak Assoc. Consulting Ltd. 1986. An update of Volume II - Churchill R. Reach Sask. - Sandfly L. Otter Rapids. Prep for: Sask. Parks and Renewable Resources, Regina, Saskatchewan and Parks Canada, Hull, Que.

Bidgood, B.F. 1968. Ecology of walleye in Richardson Lake - Lake Athabasca. Department of Lands and Forest, Alberta Fish and Wildlife Division, Fisheries Section, Edmonton, Alberta. 21pp.

Brown, J.H. 1969. The life history and ecology of the northern lake chub (Couesius plumbeus) in the La Ronge region of Saskatchewan. Thesis, University of Saskatchewan.

Brown, J.H., U.T. Hammer and G.D. Koshinsky. 1970. Breeding biology of the lake chub, Couesius plumbeus, at Lac la Ronge, Sask. J. Fish. Res. Bd. Canada, 27(6): 1006-1015.

Busch, W.D., R.L. Scholl, and W.L. Hartman. 1975. Environmental factors affecting the strength of walleye (Stizostedion vitreum vitreum) year-classes in western Lake Erie, 1960-70. J. Fish. Res. Bd. Can. 32: 1733-1743.

Chapman, C.A., and W.C. MacKay. 1984. Versatility in habitat use by a top aquatic predator, Esox lucius L. J. Fish. Biol. 25 (1):-109-115.

Chen, M.Y. 1973. Lac la Ronge creel census. 1973. SPRR, Fisheries Branch, Report 73-6.

Chen, M.Y. 1974a. Clam and Triveet Lakes, 1973. SPRR, Fisheries Branch, Report 74-6.

Chen, M.Y. 1974b. Nemeiben Lake creel census. 1974. SPRR, Fisheries Branch, Report 74-9.

Chen, M.Y. 1974c. The fisheries ecology of Besnard Lake. 1973. SPRR, Fisheries Branch, Report 74-7.

Chen, M.Y. 1976a. An appraisal of the sport fishery, Lac la Ronge, 1950-74. SPRR, Fisheries Branch, Report 76-6.

Chen, M.Y. 1976b. Population assessment of whitefish in Lac la Ronge, Sask. SPRR, Fisheries Branch, Report 76-5.

Chen, M.Y. 1977a. Lac la Ronge creel census, 1977. SPRR, Fisheries Branch, Report 77-4.

Chen, M.Y. 1977b. 25 Years Sport Fishing. Lac la Ronge record. SPRR, Fisheries Branch, Report 77-3.

Chen, M.Y. 1979a. Lake Trout, Lac la Ronge, 1978. SPRR, Fisheries Branch, Report 79-2.

Chen, M.Y. 1979b. Lac la Ronge creel census, 1978. SPRR, Fisheries Branch, Report 79-5.

Chen, M.Y. 1980. Walleye stocks in Lac la Ronge. SPRR, Fisheries Branch, Report 80-4.

Chen, M.Y., J.J. Merkowsky and L.A. Wallin. 1984. Walleye spawning run inventory in Saskatchewan. SPRR, Fisheries Branch, Report 84-4.

Chevalier, J.R. 1977. Change in walleye (Stizostedium vitreum) population in Rainy Lake and factors in abundance, 1924-75. J. Fish. Res. Bd. Can. 34: 1696-1702.

Churchill River Study (Missinipe Probe), Bathymetric and Shoreline maps. Prepared by Fisheries Study Sector. (Map series 1).

Churchill River Study (Missinipe Probe). 1973. Suggested agreement and supporting information. Prepared by the Churchill River Basin Task Force.

Churchill River Basin Task Force Report. 1972. Submitted to joint committee of the Canada-Sask. Consultation Committee and the Canada-Man. Advisory Committee.

Clifton Associates Ltd. 1986. Investigation and Conceptual Design - Blindman Lake Waste Management Scheme. Report to Saskatchewan Mining Development Corporation.

Cooke, F.R. 1966. Amphibians and Reptiles of Sask. Popular Series No. 13. Sask. Mus. Nat. Hist., Regina.

Cushing, C.E. Jr. 1963. Filter-feeding insect distribution and planktonic food in the Montreal River. Transactions of the American Fisheries Soc. 92(3): p. 216-219.

Cushing, C.E. Jr. 1964. Plankton and water chemistry in the Montreal River Lake Stream System, Sask. Ecology 45(2): p. 306-313.

Davis, E. 1976. Water Quality. Churchill River Study, Report #31.

Dean, E.L. 1975. Aquatic Ecology and Fisheries in Reindeer Lake. Churchill River Study, Report #10.

Dean, E.L. 1976. Whitefish fluctuations, factors affecting abundance. Part 1: An overview. SPRR, Fisheries Branch, Report 76-4.

Depth Sounding Maps. 1986. SPRR, Fisheries Branch, Saskatoon, Sask.

Domestic mercury samples listing for Province of Sask. Jan 1 - June 30 1986. Dept. of Fisheries and Oceans, Southern Operations Directorate, Western Region. (found in SPRR, Fisheries Branch library, Saskatoon).

Environment Canada. 1985a. Historical stream flow summary, Sask. to 1984. Inland Waters Directorate, Water Resources Branch. Water Survey of Canada, Ottawa, Canada.

Environment Canada. 1985b. Historical water levels summary, Sask. to 1983. Inland Waters Directorate, Water Resources Branch. Water Survey of Canada, Ottawa, Canada.

Environment Canada. 1985c. Surface Water Data, Saskatchewan. Inland Waters Directorate, Water Resources Branch. Water Survey of Canada, Ottawa, Canada.

Environment Canada. 1986. Sediment Data, Saskatchewan to 1984. Inland Waters Directorate, Water Resources Branch. Water Survey of Canada, Ottawa, Canada.

Fisheries and Environment Canada. 1976. Canada Water Year Book, 1976. Fisheries and Environment Canada, Ottawa, Canada.

Fisheries and Environment Canada. 1977. Water quality data Sask., 1961 - 1975. Inland Waters Directorate, Water Quality Branch, Ottawa, Canada.

Gray, Donald M. (Editor). 1970. Handbook on the Principles of Hydrology. Water Information Center, Inc.

Harris, W.C., A. Kabzems, A.L. Kosowan, G.A. Padburry and J.S. Rowe. 1983. Ecological regions of Saskatchewan. SPRR, Forestry Branch, Tech. Bull. #10.

Hecky, R.E. 1975. Sediments in Sokatisewin and Reindeer lakes. Churchill River Study, Report #12.

Hoagman, W.J. 1973. The hatching, distribution, abundance, growth, and food of the larval lake whitefish (Coregonus clupeaformis Mitchill) of Central Green Bay, Lake Michigan. Rep. Inst. Freshwater Res., Drottningholm 53:1-20.

Hofer, R. D. 1975. Hydrology (Saskatchewan). Churchill River Study, Report #2.

Huang, P.M., W.K. Liaw. 1975. Sediments in Drinking Lake. Churchill River Study, Report #15.

Huang, P.M. and W.K. Liaw. 1976. The nature of a shield lake sediment. Int. Revue. Ges. Hydrobiol. 62(3): 329-336.

Inland Waters Directorate. 1982. Detailed Surface Water Quality Data 1977-1979. Environment Canada.

Inland Waters Directorate. 1985. Historical Streamflow Summary, Saskatchewan to 1984. Environment Canada.

Integrated Environmental Services Inc. 1985a. Star Lake spring spawning - 1985. Prepared for: Saskatchewan Mining Development Corporation, Saskatoon, Sask.

Integrated Environmental Services Inc. 1985b. Test netting results for Bindman, David and Star Lakes. Prepared for: Saskatchewan Mining Development Corporation, Saskatoon, Sask.

Integrated Environmental Services Inc. 1985c. Star Lake Fisheries, an assessment of: 1. Lake Whitefish spawning in the northeast arm of Star Lake. 2. Fisheries resources in streams crossed by the access road to Star Lake. Prepared for: Saskatchewan Mining Development Corporation, Saskatoon, Sask.

Integrated Environment Services Inc. 1986a. Baseline fisheries investigations of Mallard and Yew Lakes, Saskatchewan. Prepared for: Mahogany Minerals Resources Ltd., Saskatoon, Sask.

Integrated Environmental Services Inc. 1986b. Baseline fisheries investigations of two lakes on the Star Lake Mine access road, Saskatchewan. Prepared for: Saskatchewan Mining Development Corporation, Saskatoon, Sask.

Integrated Environmental Services Inc. 1986c. Preliminary impact assessment of Alberta water management alternatives on fish resources in the Beaver-Waterhen River system in Saskatchewan. Prepared for Saskatchewan Water Corporation. Moose Jaw, Sask.

Johnson, F.H. 1961. Walleye egg survival during incubation on several types of bottom in Lake Winnibagoshish, Minnesota, and connecting waters. Trans. Am. Fish. Soc. 90: 312-322.

Johnson, R.P. 1965. Lac la Ronge creel census, 1964. SPRR, Fisheries Branch, Report 65-3.

Johnson, R.P. 1970. A Biological Survey of Black, Giles, and Wapata Lakes in Northern Saskatchewan, 1969. Saskatchewan Fisheries Laboratory. Saskatoon, Saskatchewan.

Johnson, R.P. 1971. Investigations of lake trout spawning in Lake Athabasca, 1971. SPRR and Peace-Athabasca Delta Project.

Johnson, R.P. 1972. Preliminary Report on Reindeer Lake commercial fishery. SPRR, Fisheries Branch, Report 72-3.

Kallemeyn, L.W. 1973. The Peter Pond and Churchill lakes fishery. 1972. SPRR, Fisheries Branch, Report 73-3.

Kelly, M.L. 1977. Commercial Fisheries Data Base and Economic Evaluation of the Fisheries of the Churchill River Study Area. Submitted to Northern Municipal Council, Churchill Committee.

Koshinski, G.D. 1964. Biological survey of Nemeiben Lake in North-central Sask., 1960-63. SPRR, Fisheries Branch, Report 64-1.

Koshinsky, G.D. 1965. Limnology and fisheries of five Precambrian headwater lakes of the McKay drainage in North-central Sask., 1960-64. SPRR, Fisheries Branch, Report 64-3.

Koshinsky, G.D. 1967a. Report on the Lac la Ronge creel census, 1965,66,67. SPRR, Fisheries Branch, Report 67-9.

Koshinsky, G.D. 1967b. Report on the Nemeiben Lake creel, 1966 and 1967. SPRR, Fisheries Branch, Report 67-10.

Koshinsky, G.D. 1968a. Limnology and fisheries of 28 small shield lakes near Lac la Ronge, Parts I,II,III,IV. SPRR, Fisheries Branch, Reports 68-2,-3,-4,-5.

Koshinsky, G.D. 1968b. Report on the Lac la Ronge creel census, 1968. SPRR, Fisheries Branch, Report 68-6.

Koshinsky, G. D. 1968c. Trout and McIntosh Lakes. The comparative limnology and fisheries of a Churchill River lake and an adjacent shield lake in central Saskatchewan. SPRR, Fisheries Branch, Report 71-2.

Koshinsky, G.D. 1969. Report on the Lac la Ronge and Hunter Bay creel census, 1969. SPRR, Fisheries Branch, Report 69-8.

Koshinsky, G.D. 1970. The morphometry of Shield lakes in Saskatchewan. Limnology and Oceanography. 15:695-701.

Koshinsky, G.D. 1971a. The Nemeiben Lake creel census, 1970. SPRR, Fisheries Branch, Report 71-7.

Koshinsky, G.D. 1971b. Trout and McIntosh Lakes. The comparative limnology and fisheries of a Churchill River lake and adjacent shield lake in central Sask. SPRR, Fisheries Branch, Report 71-2.

Koshinsky, G.D. 1971c. The Lac la Ronge creel census, 1970. SPRR, Fisheries Branch, Report 71-6.

Koshinsky, G.D. 1972. Nemeiben Lake creel census, 1972. SPRR, Fisheries Branch, Report 72-9.

Koshinsky, G.D. 1979. Northern pike in Lac la Ronge.
Part 1 - Biology of Northern Pike.
Part 2 - Dynamics and exploitation of the northern pike population. SPRR, Fisheries Branch, Report 79-8.

Lawrence, J.R. 1975. Primary production in Churchill and Reindeer River lakes. Churchill River Study, Report #13.

Liaw, W.K. 1976. Wathaman and Davin Lakes comparative fisheries and limnology. SPRR, Fisheries Branch, Report 76-1.

Liaw, W.K. 1984. Experimental Lynx River field hatchery. SPRR, Fisheries Branch, Report 84-4.

Liaw, W. K. and Atton, F. M. 1981. Sensitivity to acid of fishing waters in northern Saskatchewan. SPRR, Fisheries Branch, Report 81-1.

Liaw, W.K., J.F. O'Connor. 1975. Impact on five Churchill River lakes. Churchill River Study, Report #8.

Lustig, K.M. 1979. An analysis of catch and effort data from selected fishing lodges in Northern Sask., 1974-76. DNS Fisheries Data Report #1.

MacDonald, A.H., G. South, M. DuWors, & J. Hastings. 1978. Churchill River Board of Inquiry Report.

Marshall, T.L. and R.P. Johnson. 1971. History and results of fish introductions in Saskatchewan, 1900 - 1969. SPRR, Fisheries Branch, Report #8: 1-30.

McCutcheon, A. 1984. Lac la Ronge creel census. SPRR, Fisheries Branch, Report 84-7.

McCutcheon, A. 1985. Besnard Lake gamefish, 1974-79. SPRR, Fisheries Branch, Report 85-2.

Mendis, A.S. 1956. A limnological comparison of four lakes in central Saskatchewan. SPRR, Fisheries Branch, Report # 2.

Merkowsky, J.J. 1985. Experimental trout farming at Greenwater Pond, 1984. SPRR, Fisheries Branch, Report 85-4.

Mondor, C.A. 1973. Report on a National Park Reconnaissance of the Churchill River. Sask. Indian and Northern Affairs, Parks Canada. Document # I0325.

Murray, A.R. 1975. Ecology of Saskatchewan Sphaeridae. Thesis, University of Saskatchewan.

Murray, A.R. 1978. An analysis of mercury contamination in fish from Northern Saskatchewan lakes, 1969-76. SPRR, Fisheries Branch, Report 78-2.

Novakowski, N.S. 1955. Biological and fisheries survey of Reindeer Lake, 1954. SPRR, Fisheries Branch, Report 55-1.

Novakowski, N.S. 1955. Ecology of Reindeer Lake with Special Reference to Fish, 1955. Thesis, University of Saskatchewan.

Patalas, K. and A. Salki. 1975. Crustacean plankton in Reindeer Lake. Churchill River Study, Report #11.

Pugsley, W. I. 1981. Flood hydrology guide for Canada: hydrometeorological design techniques. Atmospheric Environment Service, CLI 3-81.

Quadri, S.U. 1955. The Whitefish Population of Lac la Ronge. Thesis, University of Saskatchewan.

Quadri, S.U. 1968. Growth and reproduction of the lake whitefish, *Coregonus clupeaformis*, in Lac la Ronge, Sask. J. Fish. Res. Bd. Canada. 25(10): 2091 - 2100.

Rawson, D.S. 1950. The Grayling (*Thymallus signifer*) in N. Sask. Can. Fish. Cult. No. 6.

Rawson, D.S. 1952. Brief investigation of Reindeer Lake, 1951. SPRR, Fisheries Branch, Report, 52-3.

Rawson, D.S. 1956. The life history of the yellow walleye, Lac la Ronge, 1956. SPRR, Fisheries Branch, Report 56-5.

Rawson, D.S. 1957. The life history and ecology of yellow walleye, Stizostedion vitreum, in Lac la Ronge, Sask. Tran. Am. Fish. Soc. Vol. 86: 15-37.

Rawson, D.S. 1959. Five lakes on the Churchill River near Stanley, Sask., 1959. SPRR, Fisheries Branch, Report 59-6.

Rawson, D.S. 1960. A limnological comparison of 12 large lakes in Northern Saskatchewan. Limnol. and Ocean 5(2): 195-211.

Rawson, D.S. 1961. The lake trout of Lac la Ronge, Sask. J. Fish Res. Board Canada. 18(3): 423-461.

Rawson, D.S. and F.M. Atton. 1953. Biological investigations and fisheries management at Lac la Ronge, Sask. SPRR, Fisheries Branch, Report #1: 1-39.

Reckhan, J.A. 1970. Ecology of young lake whitefish (Coregonus clupeaformis) in South Bay, Manitoulin Island, Lake Huron. In: Biology of Coregonid Fishes. C.C. Lindsey and C.S. Woods (eds). Univ. of Manitoba Press.

Robertson, M.R. 1969. An investigation of a spawning population of northern pike (Esox Lucius Linnaeus) from Floatingstone Lake, Alberta. Alta. Fish and Wildlife Res. Rep. 5. 57pp.

Saskatchewan Environment. 1980. Municipal Drinking Water Quality Objectives. Water Pollution Control Branch. Regina, Saskatchewan.

Saskatchewan Environment. 1985. Water Quality Objectives. Water Pollution Control Branch. Regina, Saskatchewan.

Saskatchewan Mining Development Corporation. 1985. Star Lake Gold Mine Environmental Impact Statement. SMDC-Starrex Mining Corp. Ltd.

Sask. Power Corp. 1977. Submission to Churchill River Board of Inquiry. Churchill River Study (Missinipe Probe). 1976. Summary Report.

Saskatchewan Parks and Renewable Resources, 1983. Fish Facts, 1983.

Saskatchewan Parks and Renewable Resources. 1985. Commercial Fish Production Statistics. Fisheries Branch, Regina.

Saskatchewan Tourism and Small Business. 1986. Saskatchewan Outdoor Adventure. 1986. Tourism Saskatchewan, Regina.

Sawchyn, W.W. 1975. Impact on the Reindeer River and four Churchill River lakes. Churchill River Study, Report #10.

Sawchyn, W.W. and E.W. Kardash. 1976. Brabant, Weirzycki, Dickens, Davis and McLennan lakes. DPRR, Fisheries Branch, Report 76-7.

Saylor, M.L. 1972. Lac la Ronge creel census, 1971-72. SPRR, Fisheries Branch, Report 72-9.

Schreiner, B.T. 1984. Quaternary geology of the Precambrian Shield, Saskatchewan. Saskatchewan Energy and Mines. Report 221.

Scott, W.B., and E.J. Crossman. 1973. Freshwater Fishes of Canada. Fish. Res. Bd. Canada. Bulletin 184. 966pp.

Seymor, G.R. 1971. A Geographical Study of the Commercial Fishing Industry in Northern Saskatchewan: An Example of Resource Development. Thesis, University of Saskatchewan.

Shapiro, J. 1952. The plankton of Lac la Ronge, Sask., 1952. Thesis, University of Saskatchewan.

Shewchuk, S. R. 1983. A snowpack and surface water chemistry survey of small lakes in northern Saskatchewan. SRC Technical Report No. 155.

TAEM. 1986. Aquatic Resources, Appendix D. In: Environmental impact assessment of the 115 kv transmission line from Uranium City to Wollaston Lake. Prepared for: Saskatchewan Power Corporation. Regina, Sask.

Taylor, V.R. 1953. Commercial fisheries of Reindeer Lake, Sask., 1952. SPRR, Fisheries Branch, Report 53-3.

Toner, E.D. 1966. Synopsis of biological data on the pike, Esox lucius L. FAD Fisheries Synopsis No. 30. Rome, Italy. 33pp.

Willard, J.R. 1975. Benthic fauna in Sokatisewin Lake. Churchill *River study, Report #14.*

6.0 DATA SOURCES AND CONTACTS

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Air Quality Branch		Lechner, Larry (Director)
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APPENDIX F-1. TABLES

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Table F-1

Gauging Stations in Study Area

Station	Station Number	Drainage Area (km2)	Gauge Location	Length of Operation	Type of Gauge	Operation	Type of Measurement
Montreal River at outlet of Bigstone Lake	06CA001	7150	55 04 40	1967-77	Manual	Continuous	
			105 21 50	1978-	Recording	Continuous	
Nemeiben Lake near La Ronge	06CB003		55 18 18	1965-79	Manual	Seasonal	Stage only
			105 12 00				
Reindeer River at outlet of Reindeer Lake	06DB002	59800	56 14 00	1929-38	Manual		Miscellaneous
			103 09 00	1939-79	Manual	Continuous	
Reindeer River at Deer Rapids	06DD001		55 36 55	1918-20	Manual		Miscellaneous
			103 10 30				
Rapid River at Outlet of Lac la Ronge	06CB002	15300	55 19 43	1919	Manual		Miscellaneous
			104 32 38	1929	Manual		Miscellaneous
				1930-57	Manual		Miscellaneous
				1959-67	Manual	Continuous	
				1968	Manual		Miscellaneous
				1970	Manual		Miscellaneous
Churchill River above Otter Rapids	06CD002	119000	55 38 47	1963-	Recording	Continuous	
			104 44 05				
Churchill River at Stanley Mission	06CD001		55 25 00	1918-21	Manual		Miscellaneous
			104 33 00				
Churchill River below Trade Lake	06CD004	140000	55 27 10	1967	Manual		Miscellaneous
			103 26 40	1968-70	Recording	Continuous	
Foster River above Churchill River	06CE001	6030	55 49 30	1972-	Recording	Continuous	
			105 45 20				
Reindeer River above Devil Rapid	06DD002	63300	56 11 35	1985-	Recording	Continuous	
			103 09 34				

Table F-2

Measured Discharges for Gauging Stations in Study Area

Station	Station Number		Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Mean
Churchill River below Trade Lake	06CD004	Mean	---	---	---	170.0	209.0	214.0	202.0	194.0	350.0	337.0	211.0	195.0	---
		Maximum	---	---	---	170.0	220.0	243.0	215.0	209.0	662.0	583.0	238.0	203.0	
		Minimum	---	---	---	170.0	198.0	185.0	188.0	179.0	172.0	180.0	183.0	187.0	
Maximum Daily Discharge - no data Minimum Daily Discharge - no data															
Churchill River above Otter Rapids	06CD002	Mean	259.0	229.0	212.0	210.0	282.0	359.0	389.0	378.0	347.0	333.0	315.0	289.0	301.0
		Maximum	520.0	421.0	370.0	370.0	622.0	790.0	864.0	883.0	761.0	689.0	604.0	554.0	
		Minimum	111.0	106.0	93.3	98.4	150.0	169.0	172.0	149.0	139.0	137.0	134.0	128.0	
Maximum Daily Discharge - 926 m3/s (26 July 74) Minimum Daily Discharge - 88.5 m3/s (ice conditions) (02 April 82)															
Reindeer River at outlet of Reindeer Lake	06DB002	Mean	348.0	357.0	358.0	338.0	285.0	291.0	303.0	310.0	328.0	306.0	308.0	331.0	322.0
		Maximum	538.0	551.0	522.0	504.0	460.0	661.0	859.0	848.0	845.0	627.0	434.0	473.0	
		Minimum	152.0	30.0	31.5	32.9	36.1	0.0	0.0	0.0	0.0	24.6	63.2	142.0	
Maximum Daily Discharge - 923 m3/s (28 Aug 46) Minimum Daily Discharge - 0 m3/s (10 May 55)															
Rapid River at outlet of Lac la Ronge	06CB002	Mean	28.8	28.4	27.8	27.7	29.5	36.1	38.6	38.4	35.3	32.9	30.3	29.5	31.9
		Maximum	37.1	36.7	35.4	34.4	36.0	44.3	49.3	47.5	44.9	41.3	36.4	36.3	
		Minimum	19.3	19.1	18.7	18.6	19.1	22.3	31.4	28.9	24.3	22.3	20.3	19.4	
Maximum Daily Discharge - 49.8 m3/s (10 July 60) Minimum Daily Discharge - 18.3 m3/s (29 April 63)															
Montreal River at outlet of Bigstone Lake	06CA001	Mean	13.1	11.6	10.5	11.4	18.6	22.3	24.9	21.4	19.1	18.7	17.4	15.1	17.2
		Maximum	25.0	35.9	35.3	39.2	58.4	53.3	57.6	56.5	58.5	59.2	50.9	42.4	
		Minimum	7.1	2.8	3.6	3.0	5.0	4.7	3.6	3.7	4.8	5.5	5.1	4.4	
Maximum Daily Discharge - 63.1 m3/s (27 May 74) Minimum Daily Discharge - 2.24 m3/s (estimated) (02 April 77)															
Foster River above Churchill River	06CE001	Mean	11.8	10.2	9.2	12.7	37.4	37.4	43.3	27.7	21.7	22.2	18.6	14.0	22.4
		Maximum	16.8	13.4	11.9	26.7	70.4	66.6	166.0	70.6	40.4	40.2	34.2	22.8	
		Minimum	6.5	5.5	5.1	5.3	10.1	11.8	13.0	11.0	5.2	6.9	8.2	7.6	
Maximum Daily Discharge - 300 m3/s (19 July 76) Minimum Daily Discharge - 4.89 m3/s (manual gauge) (04 April 82)															
Nemeiben Lake near La Ronge	06CB003	No discharge data													
Reinder River at Deer Rapids	06DD001	No discharge data													
Churchill River at Stanley Mission	06CD001	No discharge data													
Reindeer River above Devil Rapid	06DD002	Data not available at time of report.													

- all discharges in m3/s (from Water Survey of Canada, 1985)

Table F-3

Reference List of Lakes in Study Area Catalogued by Fisheries Branch

WATER BODY	LOCATION	COMM. FISHING DATA	MAPS	WATER ANALYSIS RECORDS	MERCURY ANALYSIS RECORDS	TECHNICAL REPORTS	MNGEMENT REPORTS	MISC.	THESIS	RECORD BOOKS	LAKE FILE CORR.
Adams	56°06' 104°34'		X								
Aikenhead	55°19' 104°56'	X	X	X						X	
Althouse	55°31' 104°50'		X	X	X	X				X	X
Arn	55°05' 103°31'	X									
Baldhead	55°26' 104°52'		X	X		X				X	
Bancescu	55°55' 105°57'	X									
Barker	55°40' 104°48'		X	X						X	
Barrowman	55°37' 105°20'	X			X						
Bartlett	55°30' 104°59'	X	X	X		X				X	
Bear	55°41' 104°38'	X									
Bellows	55°44' 104°53'	X			X					X	
Bent	55°21' 105°38'	X								X	
Berna	55°55' 104°17'		X								
Berven	55°47' 104°33'	X									
Besnard	55°25' 106°00'	X	X	X	X	X				X	X
Biebly	55°33' 104°48'		X	X		X				X	
Big Whitemoose	55°15' 104°12'	X									
Bigstone	55°04' 105°24'	X		X	X				X	X	X
Black Bear Is. L.	55°38' 105°40'	X			X			X		X	X
Blair	56°08' 104°26'	X									
Brabant	56°00' 103°43'		X	X		X			X	X	X
Brownell	55°00' 103°45'		X		X						
Budd	55°04' 104°39'		X		X						
Burnt	56°12' 103°37'			X							
Burrell	55°31' 106°06'	X									
"C" Lake (Anglo Rouyn Mine)	55°18' 105°00'		X	X							X
Campbell	55°46' 105°30'	X			X					X	
Carroll	55°07' 103°56'	X									
Cartier	55°05' 104°17'	X									

Table F-3 (cont'd.)

Reference List of Lakes in Study Area Catalogued by Fisheries Branch

WATER BODY	LOCATION	COMM. FISHING DATA	MAPS	WATER ANALYSIS RECORDS	MERCURY ANALYSIS RECORDS	TECHNICAL REPORTS	MNGEMENT REPORTS	MISC.	THESIS	RECORD BOOKS	LAKE FILE CORR.
Chobotuk	55°43' 105°19'	X									
Clam	55°19' 105°43'	X	X	X	X	X				X	X
Colin	55°49' 104°15'	X									
Colwell	55°05' 104°41'	X			X						
Contact	55°25' 104°52'	X	X	X		X				X	
Copp	56°25' 104°01'	X									
Cote	55°27' 104°53'		X	X		X				X	
Crew	55°39' 105°08'		X	X						X	
Crooked	55°24' 105°32'							X			X
Cycloid	55°15' 105°16'		X	X		X			X	X	X
Darieu	55°13' 103°51'	X									
Davis	55°52' 104°20'	X	X	X	X	X				X	
Deep Bay (Reindeer)	56°25' 103°00'			X							
Devil	55°40' 104°45'		X	X						X	
Dickens	55°44' 104°37'	X	X	X		X				X	
Dirks	55°40' 103°57'	X									
Dog Island	55°06' 105°15'			X							
Downton (Two Portages)	55°08' 105°14'		X	X	X	X				X	X
Dreaver	55°53' 104°47'	X									
Drinking	55°25' 104°11'	X	X	X	X	X				X	
Drope	55°26' 104°28'	X	X			X					
Duck	55°21' 104°56'			X		X			X	X	
Egg	55°05' 105°30'	X	X		X					X	X
Eliason	55°18' 105°07'			X							
Eliason Rearing Pond	55°17' 105°06'					X					
Eulas	55°54' 105°38'	X			X						
Fafard	56°13' 103°06'		X			X			X	X	
Fengstad	55°56' 105°01'	X									
Fields	56°20' 104°23'	X									

Table F-3 (cont'd.)

Reference List of Lakes in Study Area Catalogued by Fisheries Branch

WATER BODY	LOCATION	COMM. FISHING DATA	MAPS	WATER ANALYSIS RECORDS	MERCURY ANALYSIS RECORDS	TECHNICAL REPORTS	MNGEMENT REPORTS	MISC.	THESIS	RECORD BOOKS	LAKE FILE CORR.
Fiest	56°01' 105°39'	X									
Fisher	55°27' 105°37'	X									
Fitzpatrick	55°34' 105°16'	X									
Five Fingers	55°26' 104°57'		X	X		X				X	X
Flathead	55°26' 105°16'	X									
Fleming	56°23' 103°31'	X									
Forbes	55°51' 104°44'	X			X						
Freda	55°25' 104°47'	X		X							
Freestone	55°27' 104°45'			X							
French	55°38' 104°37'	X			X						
Frog Portage	55°24' 103°31'			X							
Gaynie	55°06' 103°26'	X									
Gee	55°11' 103°23'	X			X						
Glennie	55°44' 103°54'	X									
Gloeckler	56°19' 103°25'	X			X						
Gosling	55°03' 104°43'	X									
Gould	55°55' 103°27'	X									
Greywater Pond	55°01' 105°46'			X		X					
Gull	55°25' 105°48'	X									
Guncoat Bay (Mountain)	55°33' 104°23'			X							
Hailstone	55°48' 104°33'		X	X						X	
Hamilton	56°10' 105°02'	X									
Haugen	55°33' 104°49'		X	X		X				X	
Hayman	55°42' 104°50'	X	X	X						X	
Head	55°16' 105°34'	X	X	X							X
Hebden	55°27' 104°48'	X	X	X		X				X	
Henry	56°22' 103°26'	X			X						
Hepburn	55°54' 104°58'	X			X						
Hickson	56°19' 104°22'	X			X					X	

Table F-3 (cont'd.)

Reference List of Lakes in Study Area Catalogued by Fisheries Branch

WATER BODY	LOCATION	COMM. FISHING DATA	MAPS	WATER ANALYSIS RECORDS	MERCURY ANALYSIS RECORDS	TECHNICAL REPORTS	MNGEMENT REPORTS	MISC.	THESIS	RECORD BOOKS	LAKE FILE CORR.
Hill	55°31' 104°49'		X								
Hill	56°11' 104°33'	X									
Hine	55°31' 104°49'		X	X		X				X	X
Hives	55°10' 105°25'	X									
Hollowell	55°33' 105°45'	X			X						
Holmesa-Court	56°15' 105°02'	X									
Hood	55°38' 104°21'	X			X						
Hook	56°04' 104°20'	X									
Hornet	55°55' 104°05'	X									
Hunt	55°24' 104°41'	X			X						
Hunter Bay (La Ronge)	55°10' 104°30'	X		X	X	X			X	X	
Irving	55°34' 104°02'	X									
Iskwatam	55°34' 103°04'	X	X		X	X		X	X	X	
Iskwatikan	55°22' 104°24'	X	X		X					X	
Italy ("B")	55°53' 104°30'		X								
Jackie	55°21' 104°47'		X	X						X	
Jaysmith	55°59' 104°07'		X	X							
Jennifer	55°19' 104°44'		X	X							
Jewett	56°08' 104°38'	X			X					X	
Kane	56°54' 103°32'	X		X							
Kavanagh	55°36' 105°02'	X									X
Keg	55°24' 104°03'	X	X	X		X				X	
Keith	55°59' 105°12'	X			X						
Kelly	55°53' 103°49'	X			X						
Kemp	55°40' 104°16'	X			X						
Kenyon	56°18' 104°54'	X									
Kinosao Ck.	55°13' 105°18'			X						X	
Kliman	55°46' 104°23'	X									
Komarniski	55°52' 106°00'	X									

Table F-3 (cont'd.)

Reference List of Lakes in Study Area Catalogued by Fisheries Branch

WATER BODY	LOCATION	COMM. FISHING DATA	MAPS	WATER ANALYSIS RECORDS	MERCURY ANALYSIS RECORDS	TECHNICAL REPORTS	MNGEMENT REPORTS	MISC.	THESIS	RECORD BOOKS	LAKE FILE CORR.
Kraus	55°42' 103°53'	X									
Kruger	55°45' 104°48'	X									
Kuskawao (Portage)	55°27' 104°53'		X	X		X				X	
Lac La Ronge	55°10' 105°00'	X	X	X	X	X		X	X	X	X
Laird	55°55' 103°23'	X			X						
Larocque	55°52' 104°38'	X									
Larson	55°47' 105°42'	X									
Lindoff	56°03' 104°37'	X									
Lindsay	56°04' 103°54'		X								
Linstrom	55°22' 103°27'		X	X							
Little Crooked	55°32' 105°21'	X									
Little Deer	55°24' 104°55'	X	X	X		X			X	X	
Lloyd	55°01' 103°00'	X									
Lobb	55°20' 103°30'	X			X						
Lorenson	55°47' 106°00'	X									
Lovell	55°07' 103°15'	X			X						
Loving	55°19' 104°34'										X
Lueder	55°06' 103°26'	X									
Lussier	55°35' 104°47'		X	X		X				X	X
Lynx R.	55°20' 104°59'									X	
MacKay	55°27' 104°56'	X	X	X		X		X	X	X	X
MacLean	55°55' 104°13'	X		X	X						
Manawan	55°24' 103°14'	X	X	X	X	X				X	
Maribelli	56°13' 104°26'	X									
May	56°21' 103°45'	X									
Maynard	55°02' 103°56'	X									
McComb	55°32' 104°50'		X	X		X				X	
McCrea	56°21' 104°32'	X									
McGunigal	55°48' 105°22'	X									

Table F-3 (cont'd.)

Reference List of Lakes in Study Area Catalogued by Fisheries Branch

WATER BODY	LOCATION	COMM. FISHING DATA	MAPS	WATER ANALYSIS RECORDS	MERCURY ANALYSIS RECORDS	TECHNICAL REPORTS	MNGEMENT REPORTS	MISC.	THESIS	RECORD BOOKS	LAKE FILE CORR.
McIntosh	55°45' 105°08'	X	X	X	X	X				X	X
McLean	55°55' 104°11'									X	
McLennan	55°53' 104°22'	X	X	X	X					X	X
McLennan	56°26' 103°26'					X					X
McMillan	55°44' 105°09'		X								X
McNichol	55°29' 104°40'		X	X		X				X	
McRae	56°05' 105°48'	X									
McTavish	55°55' 105°18'	X			X						X
Mekewap	55°24' 104°52'		X	X		X				X	X
Melanson	55°38' 105°55'	X			X						
Midway	55°15' 105°21'		X	X		X			X	X	X
Minuhik	55°47' 104°26'		X								
Montreal R.	55°05' 105°19'			X				X	X	X	X
Morin	55°10' 105°50'				X						
Morning	55°22' 105°50'	X	X								
Mosquito	55°23' 104°53'		X							X	
Mountain	55°29' 104°30'	X	X	X	X	X					
Mountney	55°42' 105°07'	X	X	X	X					X	
Mulligan	55°15' 103°28'	X			X						
Mullock (3-Islands)	55°28' 104°51'		X	X		X				X	X
Munro	55°43' 103°31'		X								
Nagle	56°06' 105°21'	X									X
Naniskak (E&W) (Twin)	55°26' 104°56'		X	X		X				X	X
Nataweuse	55°17' 103°36'	X			X						
Nayelles	56°20' 103°50'	X									
Nemeiben	55°20' 105°20'	X	X	X	X	X			X	X	X
Nemeiben Ck.	55°17' 105°10'									X	
Nicholson	55°09' 103°31'	X									
Nielson	55°05' 103°09'	X									

Table F-3 (cont'd.)

Reference List of Lakes in Study Area Catalogued by Fisheries Branch

WATER BODY	LOCATION	COMM. FISHING DATA	MAPS	WATER ANALYSIS RECORDS	MERCURY ANALYSIS RECORDS	TECHNICAL REPORTS	MNGEMENT REPORTS	MISC.	THESIS	RECORD BOOKS	LAKE FILE CORR.
Nipew (Dead)	55°41' 105°00'	X	X	X	X					X	
Nistowiak	55°25' 104°20'	X	X		X	X		X		X	
No Name	55°26' 102°57'	X									
Nunn	55°15' 104°20'	X			X						
Olson	55°53' 105°30'	X									
Otter	55°35' 104°39'	X	X	X	X	X			X	X	
Otter Rapids	55°38' 104°44'								X	X	
Ourom	55°36' 103°12'	X	X	X	X	X				X	
Palf	55°01' 103°27'	X									
Partridge Crop	55°04' 105°46'	X									
Paull	56°08' 104°48'	X			X						
Pechey (Round)	55°23' 104°54'	X	X	X		X				X	X
Pelican	55°08' 103°00'	X	X	X	X	X				X	X
Piney	55°03' 103°12'	X									
Pixley	55°22' 103°24'		X								
Planinshek	55°33' 103°46'	X									
Platana	55°10' 104°10'	X									
Potato	55°00' 105°20'	X								X	X
Potato R.	55°01' 105°15'								X	X	
Poulton	55°27' 104°54'		X	X		X				X	
Powdrill	55°05' 104°32'	X			X						
Preston	55°19' 103°03'	X			X						
Preview	55°25' 104°49'		X	X		X				X	
Prongua	55°07' 103°12'	X								X	
Propp	55°42' 104°09'	X									
Putnam	55°50' 105°29'	X									
Rainbow	55°44' 104°41'		X								
Rapid R.	55°24' 104°22'								X		
Ray	55°50' 103°44'					X					

Table F-3 (cont'd.)

Reference List of Lakes in Study Area Catalogued by Fisheries Branch

WATER BODY	LOCATION	COMM. FISHING DATA	MAPS	WATER ANALYSIS RECORDS	MERCURY ANALYSIS RECORDS	TECHNICAL REPORTS	MNGEMENT REPORTS	MISC.	THESIS	RECORD BOOKS	LAKE FILE CORR.
Reindeer R.	55°36' 103°11'	X			X	X				X	
Renton	55°28' 104°23'	X			X						
Richter	55°26' 104°54'		X	X		X				X	
Robertson	55°46' 104°05'	X									
Robinson	55°30' 103°43'	X									
Rose	55°33' 105°37'	X									
Rottenstone	56°21' 104°51'	X		X							X
Roundish	55°54' 104°26'	X									
Sadler	55°17' 103°45'	X			X						
St John	55°27' 104°43'	X			X						
Sanderson	55°07' 105°51'	X									
Sayese	55°37' 103°50'	X									
Scythes	55°24' 104°55'		X	X		X				X	
Settee	55°50' 104°05'	X									
Shadd	55°41' 105°26'	X									
Siegel	55°23' 103°04'	X			X						
Sikachu	55°05' 105°43'	X									
Sim	55°27' 104°42'	X	X	X	X	X				X	
Smith-Jones	55°33' 106°00'	X									
Sotkowy	55°36' 104°24'	X			X						
Stack	55°42' 105°10'	X	X							X	
Star	55°59' 104°19'										X
Stauffer	55°42' 104°30'	X									
Steele	55°12' 104°05'	X									
Steephill	55°58' 103°09'	X	X		X	X			X	X	
Stilborn	55°08' 104°01'	X			X						
Stusiak	55°41' 105°20'	X			X						
Sucker	56°12' 103°36'	X									
Sulphide	55°22' 104°54'	X	X	X		X				X	

Table F-3 (cont'd.)

Reference List of Lakes in Study Area Catalogued by Fisheries Branch

WATER BODY	LOCATION	COMM. FISHING DATA	MAPS	WATER ANALYSIS RECORDS	MERCURY ANALYSIS RECORDS	TECHNICAL REPORTS	MNGEMENT REPORTS	MISC.	THESIS	RECORD BOOKS	LAKE FILE CORR.
Sutherland	55°20' 104°52'		X	X						X	
Syntak	55°25' 103°03'	X			X						
Tapeese	55°24' 103°04'	X			X						
Teneycke	55°26' 104°55'		X	X		X				X	
Thomas	55°17' 104°28'	X			X					X	
Thomas Ck.	55°17' 104°49'									X	
Thompson	55°59' 105°25'				X						
Thoreson	56°05' 104°31'	X									
Toland Bay L.	55°18' 104°50'		X								
Torrance	55°39' 105°07'	X	X	X						X	
Totton	55°24' 105°32'	X									
Trade	55°22' 103°44'	X	X	X	X	X				X	
Triveet	55°22' 105°46'	X	X	X		X				X	X
Trout	55°37' 105°16'	X	X	X	X	X		X		X	
Turtle	55°24' 104°54'									X	
Two Rivers	55°45' 103°09'		X			X			X	X	
Ukoop	55°19' 103°05'	X			X						
Unnamed Lakes	55°55' 104°18'		X								
Lake 6.4 (Hwy. 2)	55°43' 104°41'			X						X	
Lake 9	55°09' 103°05'				X						
Lake 9.4	55°45' 104°39'			X						X	
Lake 10.7E	55°45' 104°37'			X							
Lake 10.7W	55°45' 104°37'			X							
Lake 13.1	55°47' 104°35'			X							
Lake 21.8	55°51' 104°26'			X							
Lake 24.0	55°53' 104°24'			X							
Upises	55°26' 104°54'		X	X		X				X	
Uskik	55°32' 103°17'	X	X	X	X	X				X	
Versailles	55°49' 104°21'	X									

Table F-3 (cont'd.)

Reference List of Lakes in Study Area Catalogued by Fisheries Branch

WATER BODY	LOCATION	COMM. FISHING DATA	MAPS	WATER ANALYSIS RECORDS	MERCURY ANALYSIS RECORDS	TECHNICAL REPORTS	MNGEMENT REPORTS	MISC.	THESIS	RECORD BOOKS	LAKE FILE CORR.
Waddy	56°10' 103°52'	X			X						
Wadin Bay (La Ronge)	55°17' 105°05'			X							
Wapassini	55°47' 104°00'	X									
Watts	55°45' 105°03'	X									
West	55°19' 104°34'		X								X
Westroud	55°21' 104°47'	X									
White	56°00' 103°16'	X									
Wierzycki	56°01' 103°56'	X	X	X		X				X	
Windrum	56°04' 104°10'										
Wood	55°17' 103°17'	X	X	X	X	X				X	
Wood Ck.	55°05' 105°19'									X	

Table F-4

Recorded Surface Water Users

Name	Project	NTS Map Location	Allocation (cubic decametres)	Diversion (cubic decametres)	Class	Supply	Type	Purpose
Town of La Ronge	La Ronge	73P/03	1233	1233	---	Natural lake	S *	Municipal
Freshwater Fish Marketing	---	73P/3	9	9	---	Natural lake	I*	Municipal
Village Air Ronge	Air Ronge	73P/3	123	123	---	Directly from water course	---	Municipal
Sask Govt DPRR	La Ronge Dam	73P/7	---	---	---	---	---	Other
Sask Mining Development Corp	Star Lake Project	73P/16	---	---	Main supply	Natural lake	J*	Industrial

*Notes:
S - system of distribution for communal municipal use.
I - Fishing and trapping industry
J - Mines

Table F-5

Summary of Surface Water Quality Data

LAKE	REFERENCE	SAMPLING DATE	SPECIFIC CONDUCTIVITY (umohs/cm)	ALKALINITY AS CaCO3 (mg/L)	TDS (mg/L)	pH top	pH bottom	CO3 (mg/L)	HCO3 (mg/L)	Cl (mg/L)	SO4 (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)
Trout	71-2*	15-Aug-63	160.0	83.0	107.0	7.7	7.6	14.0	78.0	nil	nil	20.0	8.0	6.0	<5
McIntosh	71-2	1-Aug-63	31.0	16.0	40.0	7.1	6.6	nil	20.0	nil	nil	4.0	1.0	<5	1.0
McLennan	76-7	21-Aug-70	47.0	24.0	35.0	7.2	6.8	0.0	23.7	1.4	<2	5.7	1.5	1.1	1.0
Davis	76-7	14-Aug-70	44.0	20.0	60.0	7.1	6.8	0.0	23.3	<1	<2	5.3	1.5	1.5	1.1
Dickens	76-7	20-Aug-70	50.0	26.0	41.0	7.2	6.6	0.0	25.3	<1	<2	5.9	1.4	1.4	1.4
Wierzycki	76-7	26-Aug-70	44.0	26.0	55.0	7.1	6.3	0.0	24.0	<1	<2	5.2	2.0	0.9	1.4
Brabant	76-7	26-Aug-70	51.0	24.0	58.0	7.0	6.3	0.0	20.0	<1	<2	4.4	1.5	1.3	1.2
Nemeiben	64-1	Jul-61	60.0		45.0	7.2-8.1	6.6-7.3	nil	32.0	7.0	4.0	5.6	4.1	3.3	1.8
MacKay	64-3	1960-61	52.0	17.0	60.0	7.4	6.8	nil	29.0	14.0	2.0	5.8	1.6	2.2	0.8
Contact	64-3	1961-62	72.0	20.0	55.0	7.3	6.6	nil	35.0	10.0	3.0	8.0	5.0	1.8	1.7
Sulphide	64-3	1961-62	80.0	27.0	55.0	7.7	6.9	nil	39.0	7.0	5.3	8.0	2.2	2.6	2.3
Little Deer	64-3	1960	59.0	18.0	55.0	7.3	6.8	nil	32.0	10.0	3.0	2.6	4.1	3.5	2.5
Hebden	64-3	1961-62	39.0	19.0	45.0	7.4	6.7	nil	37.0	3.0	3.0	4.8	2.4	2.4	1.3
Bartlett	68-4	4-Jan-68	58.0	16.0	45.0	7.1	6.7	nil	29.8	nil	nil	6.6	2.0	2.2	1.6
Lussier	68-4	5-Jan-68	52.0	18.0	50.0	7.2	6.6	nil	29.4	nil	nil	4.3	2.9	2.4	2.2
Haugen	68-4	4-Jan-68	42.0	15.0	30.0	7.1	6.6	nil	22.8	nil	nil	4.9	1.5	1.8	1.0
McComb	68-4	4-Jan-68	41.0	16.0	35.0	7.0	6.5	nil	22.6	nil	nil	5.0	1.0	1.8	1.0
Bielby	68-4	5-Jan-68	47.0	18.0	50.0	7.2	6.8	nil	23.2	nil	nil	5.5	1.8	2.2	1.3
Althouse	68-4	5-Jan-68	49.0	13.0	60.0	6.7	6.3	nil	22.9	nil	nil	6.1	1.8	2.0	1.0
Hine	68-4	5-Jan-68	56.0	17.0	50.0	7.1	6.5	nil	26.5	nil	nil	6.7	1.8	2.2	1.4
Mullock	68-4	5-Jan-68	58.0	17.0	55.0	7.1	6.5	nil	29.4	nil	nil	7.6	1.9	2.0	1.2
Poulton	68-4	6-Jan-68	57.0	17.0	45.0	7.1	7.1	nil	29.8	nil	nil	7.3	1.7	1.8	1.3
Kuskawao	68-4	6-Jan-68	63.0	18.0	45.0	7.2	7.1	nil	32.7	nil	nil	8.4	1.3	1.8	1.6
Cote	68-4	6-Jan-68	63.0	18.0	40.0	7.1	7.0	nil	32.3	nil	nil	8.2	1.6	1.8	1.6
Baldhead	68-4	6-Jan-68	64.0	19.0	55.0	7.1	6.4	nil	32.3	nil	nil	8.2	1.9	1.9	1.4
Teneycke	68-4	5-Jan-68	96.0	25.0	80.0	7.3	6.7	nil	57.2	nil	nil	14.6	1.9	2.4	2.0
Upises	68-4	5-Jan-68	60.0	21.0	70.0	7.1	6.5	nil	34.0	nil	nil	6.0	2.8	2.4	1.9
Richter	68-4	5-Jan-68	68.0	25.0	70.0	7.0	6.7	nil	38.0	nil	nil	8.7	2.1	2.3	2.0
Five Fingers	68-4	4-Jan-68	65.0	14.0	70.0	3.9	6.4	nil	26.8	nil	nil	7.4	1.9	1.5	1.5
West Naniskak	68-4	6-Jan-68	51.0	17.0	60.0	6.8	6.5	nil	25.9	nil	nil	6.3	1.7	1.8	2.0
East Naniskak	68-4	6-Jan-68	56.0	23.0	60.0	6.8	6.6	nil	36.0	nil	nil	7.5	1.9	1.6	1.7
Scythes	68-4	4-Jan-68	76.0	22.0	65.0	7.2	6.9	nil	45.4	nil	nil	9.8	2.6	2.6	2.7
Pechey	68-4	5-Jan-68	64.0	24.0	55.0	7.3	6.6	nil	36.4	nil	nil	7.6	2.4	2.3	2.0

Table F-5 (cont'd.)

Summary of Surface Water Quality Data

LAKE	REFERENCE	SAMPLING DATE	SPECIFIC CONDUCTIVITY (umohs/cm)	ALKALINITY AS CaCO3 (mg/L)	TDS (mg/L)	pH top	pH bottom	CO3 (mg/L)	HCO3 (mg/L)	Cl (mg/L)	SO4 (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)
Preview	68-4	4-Jan-68	170.0	77.0	130.0	7.9	7.2	nil	109.0	nil	nil	30.2	4.3	2.8	3.2
Sim	68-4	4-Jan-68	80.0	26.0	70.0	7.2	6.5	nil	45.1	nil	nil	10.8	2.4	2.2	1.9
McNichol	68-4	4-Jan-68	80.0	26.0	70.0	7.3	7.0	nil	41.5	nil	nil	10.6	2.6	2.2	1.9
Mekewap	68-4	4-Jan-68	160.0	69.0	135.0	8.0	7.0	nil	100.0	nil	nil	25.2	3.2	1.9	3.3
Duck	68-4	4-Jan-68	162.0	52.0	125.0	7.4	7.2	nil	89.7	nil	nil	25.1	4.1	2.5	3.4
Lynx	68-4	6-Jan-68	90.0	25.0	90.0	7.2	6.9	nil	48.3	nil	nil	12.6	2.4	2.4	2.5
Cycloid	68-4	6-Jan-68	26.0	4.0	30.0	6.0	6.0	nil	6.6	nil	nil	1.8	1.8	1.3	1.7
Midway	68-4	5-Jan-68	72.0	24.0	70.0	7.0	6.9	nil	37.0	nil	nil	7.5	2.9	2.8	1.5
Fafard	75-2	1973	25.4	11.0	30.0	6.8	6.7	0.0	13.0	<1		2.9	0.8	1.0	0.7
Royal	75-2	1973	25.0	10.2	26.0	6.8	6.5	0.0	9.3	1.4		3.3	0.8	1.0	0.7
Steephill	75-2	1973	35.6	14.3	49.0	6.9	6.3	0.0	17.0	2.8		5.6	0.1	1.4	1.1
The Two Rivers	75-2	1973	27.2	11.8	30.0	6.8	6.7	0.0	14.0	<1		3.5	0.6	1.1	0.7
Iskwatam	75-2	1973	119.5	60.0	88.0	7.6	7.5	0.0	71.0	1.7		14.0	4.0	4.2	1.5
Wapumon	75-2	1973	108.0	54.0	92.0	7.6	7.3	0.0	70.0	<1		14.0	4.5	4.2	1.5
Wintego	75-2	1973	119.0	58.0	90.0	7.6	7.5	0.0	70.0	<1		14.0	4.6	4.2	1.5
Pita	75-2	1973	116.5	57.0	88.0	7.5	7.5	0.0	71.0	<1		14.0	4.2	4.3	1.5
Drinking	75-1	1974	149.0	78.0	115.0	7.1-7.5	7.1-7.4	0.0	95.0	2.0	<1	14.0	8.0	5.8	2.1
Keg	75-1	1974	154.0	74.0	110.0	7.2-7.5	7.0-7.5	0.0	90.0	<1	<1	18.0	6.0	5.4	1.8
Trade	75-1	1974	147.0	76.0	106.0	7.1-7.5	7.1-7.5	0.0	93.0	2.0	<1	19.0	6.0	5.3	1.7
Uskik	75-1	1974	149.0	76.0	102.0	7.1-7.5	7.1-7.5	0.0	93.0	2.0	<1	18.0	5.0	5.1	1.7
Ouron	75-1	1974	140.0	72.0	125.0	7.1-7.5	7.1-7.4	0.0	88.0	2.0	<1	19.0	5.0	4.9	1.5
Otter Rapids	75-9	1974	138.0	74.0	77.0	7.8		0.0	87.0	2.4	4.9	18.0	5.8	5.5	1.6
Drinking Falls	75-9	1974	138.0	74.0	83.0	7.8		0.0	90.0	2.1	4.7	19.0	6.2	5.3	1.6
Wintego	75-9	1974	88.0	56.0	66.0	7.7		0.0	68.0	1.6	3.1	15.0	4.5	4.0	1.4
Island Falls	75-9	1974	97.0	54.0	64.0	7.7		0.0	66.0	1.6	2.9	15.0	4.1	3.8	1.4
Atik Falls	75-9	1974	27.0	13.0	18.0	7.6		0.0	16.0	0.7	2.1	3.7	1.0	1.1	0.8
Whitesand	75-9	1974	25.0	11.0		7.6		0.0	11.0	0.4	2.0	3.2	0.8	0.9	0.6
Mountain Lake	59-6	1957			136.0	7.6-8.1	7.3-7.8	0.0	118.6	0.0	5.3	31.6	9.2	7.4	
Guncoat Bay	59-6	1957			140.0	7.1-7.4	6.7	0.0	41.5	0.0	2.3	1.2	3.2	0.2	
Drope	59-6	1957				7.7-7.9	7.3-7.8								
Nistowiak	59-6	1957				7.7-7.8	7.5-7.8								
Otter	59-6	1957			146.0	7.6-8.2	7.3-7.6	0.0	131.8	0.0	11.1	24.1	10.7	11.5	
Drinking	59-6	1957				7.8-8.0	7.6-7.9								

Table F-5 (cont'd.)

Summary of Surface Water Quality Data

LAKE	REFERENCE	SAMPLING DATE	SPECIFIC CONDUCTIVITY (umohs/cm)	ALKALINITY AS CaCO3 (mg/L)	TDS (mg/L)	pH top	pH bottom	CO3 (mg/L)	HCO3 (mg/L)	Cl (mg/L)	SO4 (mg/L)	Ca (mg/L)	Mg (mg/L)	Na (mg/L)	K (mg/L)
Montreal River at Outlet of Bigstone Lake															
	IWD-1**	7-Oct-77	178.0	104.0	107.0	7.1		0.0	127.0	1.3	3.6	7.4	?	4.0	1.6
Churchill River at Otter Rapids															
	IWD-1	3-Oct-79	130.0	57.0	65.0	7.9		0.0	69.0	2.0	3.2	13.3	5.0	4.7	1.2
Reindeer River at Outlet of Reindeer Lake at Whitesand Dam															
	IWD-1	3-Oct-79	26.0	8.7	14.0	7.8		0.0	11.0	0.3	1.4	2.7	1.9	1.0	0.6
Clam	74-6	June,July-73	56.7	25.0	51.0	7.9-8.1	7.0-8.1	0.0	30.0	<1	<1	6.4	2.3	2.9	1.8
Triveet	74-6	June,July-73	56.5	25.0	63.0	7.5-7.1	7.1	0.0	31.0	<1	<1	6.7	2.6	2.3	1.4
Besnard	74-7	Jul-73	82.0	41.0	61.0	7.4-8.7	6.8	0.0	50.0	<1	<1	11.6	3.7	2.1	1.4
Star	***	1983-84	48-89	16-24	48-69	6.5-7.9		nil	21-29	.3-.5	2.8-4.3	4.-10.	1-1.8	0.7-1.6	0.8-2.1

* refers to Fisheries Branch Technical Report number.
** refers to Inland Waters Directorate, 1982.
*** Clifton Associates Ltd., 1986

Table F-6

Additional Surface Water Quality Data

	LOCATION	Star Lake	Fafard Lake	Royal Lake	Steephill Lake	The Two Rivers Lake	Iskwatam Lake	Wapumon Lake	Wintego Lake	Pita Lake
	DATE	1983-84	1974	1974	1974	1974	1974	1974	1974	1974
PARAMETER	UNITS									
PHYSICAL PROPERTIES										
Field pH	pH units		6.8	6.8	6.9	6.8	7.6	7.6	7.6	7.5
Conductivity	uS/cm	48-89	25.4	25	35.6	27.2	119.5	108	119	116.5
Laboratory pH	pH units	6.5-7.9								
Total Alkalinity	mg/L	16-24	11	10.2	14.3	11.8	60	54	58	57
Total Hardness	mg/L	3.-32	10.5	11.4	14.3	11.2	52	54	53	52
Total Dissolved Solids	mg/L	48-69	30	26	49	30	88	92	90	88
MAJOR IONS										
Calcium	mg/L	4.-10.	2.9	3.3	5.6	3.5	14	14	15	14
Magnesium	mg/L	1.-3.	0.8	0.9	1.2	1.2	5.4	4.4	4.9	4.6
Potassium	mg/L	0.8-2.1	0.5	0.5	1	0.6	1.4	1.4	1.4	1.4
Sodium	mg/L	0.7-1.6	0.95	0.95	4	1	3.7	3.7	3.7	3.8
Carbonate	mg/L	0	0	0	0	0	0	0	0	0
Bicarbonate	mg/L	20-29	13.4	12.6	16.5	14	71	70	70	71
Hydroxide	mg/L		0	0	0	0	0	0	0	0
Chloride	mg/L	0.3-0.5	<1	<1	<1	<1	1.7	<1	<1	<1
Sulphate	mg/L	2.8-4.3								
Nitrate	mg/L									
Iron	mg/L	0.043-0.53	0.12	0.15	0.14	0.16	0.13	0.06	0.09	0.12
Manganese	mg/L	0.004-0.047	0.009	0.013	0.009	0.009	0.036	0.032	0.022	0.036
NUTRIENTS										
Nitrogen - ammonia	mg/L	0.02-0.09	0.025	0.03	0.027	0.025	0.025	0.037	0.018	0.019
Nitrate/Nitrite	mg/L	0.006-0.08	0.001	0.002	0.01	0.001	0.004	0.013	0.013	0.007
Total Kjeldahl Nitrogen	mg/L	0.34-0.66								
Total Nitrogen(UV digestion)	mg/L	0.42-0.68								
Phosphorous - inorganic	mg/L									
Ortho-Phosphate	mg/L	<0.02	0.023	0.016	0.019	0.02	0.03	0.02	0.025	0.036
Phosphate - total	mg/L	<0.02								
METALS										
Aluminum	mg/L	0.04-0.22								
Barium	mg/L	0.011-0.067	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02
Beryllium	mg/L									
Bismuth	mg/L									
Cadmium	mg/L	<0.001-0.002	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Chromium	mg/L	0.002-0.012	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cobalt	mg/L	<0.001								
Copper	mg/L	0.003-0.008	0.003	0.001	0.002	0.002	<0.001	<0.002	<0.001	<0.005
Gold	mg/L									
Lead	mg/L	<0.005	<0.001	0.001	<0.001	<0.001	0.002	0.001	<0.001	0.002
Molybdenum	mg/L	<0.005-0.006								
Nickel	mg/L	0.001-0.003	<0.006	0.001	0.007	0.01	0.006	0.006	0.006	0.006
Silver	mg/L									
Vanadium	mg/L									
Zinc	mg/L	0.003-0.036	0.003	0.003	<0.001	<0.001	<0.001	0.004	0.004	0.003
TRACE CONSTITUENTS										
Arsenic	mg/L	<0.0005	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Boron	mg/L	0.01-0.03								
Bromide	mg/L	<0.1								
Cyanide	mg/L	0.6-25								
Mercury	mg/L	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Selenium	mg/L									
Sulfide (D.E.)	mg/L	<0.01-0.02								
Sulfide/Mercaptan (T)	mg/L									

(Clifton Associates Ltd., 1986 and Sawchyn, 1975)

Table F-7. Summary of available data relevant to the aquatic biological resources of the La Ronge Greenstone Belt.

	Fish	Plankton	Benthos	Macrophytes	Comm. Fish.	Comm. Fish Quota	Test Netted	Fish Hg Analysis	Fish Introductions	Fish Stocking	Outfitter Camp	Campground	Offal Counts	Sediment Analysis
CHURCHILL RIVER DRAINAGE BASIN														
1. REINDEER R.														
Hickson Lake														
Asiski Lake	x	x	x				x					x		
Deception Lake	x				x						B			
Hickson Lake	x							x			B			
Hook Lake	x				x									
Jewett Lake	x				x						B			x
Macoun Lake	x				x	x		x			B			
Maribelli Lake	x				x	x					B			
McLellan Lake											B			
Missi Lake	x										D			
Oneman Lake	x										B			
Thoreson Lake											B			
Numabin Bay														
Fleming Lake	x				x									
Henry Lake	x				x									
Reindeer Lake	x	x	x	x	x	x	x	x			B	x	x	x
Sucker Lake	x				x	x								
Harriott River														
Fafard Lake	x	x	x	x	x		x							x
Finlayson Lake											D			
Gladman Lake	x										D			
Wapiskaw/Reindeer Rivers														
Berney Lake	x				x	x								
Brabant Lake	x	x	x		x		x					x		
Buchanan Lake	x													
Burnt Lake	x				x	x								
Calder Lake	x					x								
Copp Lake	x				x						B			
Haugen Lake	x	x	x				x							
Hornet Lake	x													
Iskwatam Lake		x	x	x			x							x
Jaysmith Lake	x							x		x				
Kakabigish Lake	x				x	x					B			
Kelly Lake	x				x			x			B			
Kenwood Lake	x										B			

Table F-7 (cont'd.). Summary of available data relevant to the aquatic biological resources of the La Ronge Greenstone Belt.

	Fish	Plankton	Benthos	Macrophytes	Comm. Fish.	Comm. Fish Quota	Test Netted	Fish Hg Analysis	Fish Introductions	Fish Stocking	Outfitter Camp	Campground	Offal Counts	Sediment Analysis
Laird Lake	x				x			x						
May Lake	x				x	x								
Nayelles Lake	x										D			
Nistoassini Lake	x										D			
Ray Lake	x										B			
Reindeer River	x	x	x	x	x	x	x	x						x
Royal Lake	x	x	x	x	x	x	x	x						x
Settee Lake	x				x						B			
Steephill Lake	x	x	x	x	x	x	x	x			D			x
The Two Rivers		x	x	x			x							x
Waddy Lake	x				x	x		x			B			
White Lake	x				x	x								
Wierzycki Lake	x	x	x			x	x							
Windrum Lake	x				x	x								
2. CHURCHILL R.														
Foster River														
Eulas Lake	x				x			x			B			
Nagle Lake	x				x						B			
Black Bear Island														
Allan Lake	x										D			
Barker Lake	x										D			
Bartlett Lake	x	x	x			x	x							
Bellows Lake	x					x								
Besnard Lake	x	x	x		x	x	x	x			B	x	x	
Black Bear Island	x				x	x		x			T			
Blindman Lake	x						x							
Campbell Lake	x				x									
Churchill River	x										T	x		
David Lake	x						x							
Devil Lake	x										D			
Fitzpatrick Lake	x										D			
Forbes Lake	x				x	x		x			B			
Hepburn Lake	x				x	x		x			B			
Hollowell Lake	x							x			D			
Hood Lake								x						
Kavanagh Lake	x													
Keith Lake	x				x			x			D			
Kenyon Lake	x				x						B			

Table F-7 (cont.). Summary of available data relevant to the aquatic biological resources of the La Ronge Greenstone Belt.

	Fish	Plankton	Benthos	Macrophytes	Comm. Fish.	Comm. Fish Quota	Test Netted	Fish Hg Analysis	Fish Introductions	Fish Stocking	Outfitter Camp	Campground	Offal Counts	Sediment Analysis
Kinososkaw Lake	x					x					D			
Larocque Lake	x													
Larson Lake	x					x					D			
Little Crooked Lake	x					x								
Mallard Lake	x			x			x							
McGunigal Lake	x					x					D			
McIntosh Lake	x	x	x		x	x	x	x			B			
McTavish Lake	x							x			B			
Melanson Lake	x					x					D			
Mountney Lake	x							x						
Nipew Lake	x				x	x		x			D			
Paull Lake	x				x	x		x			D			
Rottenstone Lake	x				x	x								
Roundish Lake	x													
Rush Lake	x													
Sandy River	x													
Shadd Lake	x										B			
Star Lake	x						x							
Sunday Lake	x						x							
Thompson Lake								x						
Trout Lake	x	x	x		x	x	x	x			T			
Thursday Lake	x						x							
Yew Lake	x			x			x							
Otter Lake														
Althouse Lake	x	x	x				x					x		
Baldhead Lake	x	x	x				x							
Berna Lake	x								x	x	D			
Bevern Lake	x													
Bielby Lake	x	x	x				x							
Churchill River	x										B	x		
Colin Lake	x				x	x								
Contact Lake	x	x	x		x		x							
Cote Lake	x	x	x				x							
Cratty Lake												x		
Davis Lake	x	x	x		x	x	x	x						
Dickens Lake	x	x	x			x	x					x		
Feldspar Lake										x				
Five Fingers Lake	x	x	x				x			x		x		
Freda Lake	x													

Table F-7 (cont.). Summary of available data relevant to the aquatic biological resources of the La Ronge Greenstone Belt.

	Fish	Plankton	Benthos	Macrophytes	Comm. Fish.	Comm. Fish Quota	Test Netted	Fish Hg Analysis	Fish Introductions	Fish Stocking	Outfitter Camp	Campground	Offal Counts	Sediment Analysis
Freestone Lake	x													
Glennie Lake	x				x	x					B			
Hebden Lake	x	x	x				x							
Hine Lake	x	x	x				x							
Hunt Lake	x					x		x						
Italy Lake										x				
Kemp Lake	x					x		x						
Kliman Lake	x													
Kuskawao Lake	x	x	x				x							
Little Deer Lake	x	x	x			x	x					x		
Lussier Lake	x	x	x				x			x		x		
MacKay Lake	x	x	x				x					x		
MacLean Lake	x					x		x						
McComb Lake	x	x	x				x							
MeKewap Lake	x	x	x				x			x				
McLennan Lake	x	x	x		x	x	x	x			B	x	x	
McNichol Lake	x	x	x				x							
Minuhik Lake	x													
Mountain Lake	x	x	x		x	x	x	x			B			
Mullock Lake	x	x	x				x			x		x		
Naniskak E Lake	x	x	x				x			x		x		
Naniskak W Lake	x	x	x				x			x		x		
Otter Lake	x	x	x		x	x	x	x			B	x		
Pechey Lake	x	x	x			x	x							
Poulton Lake	x	x	x				x							
Preview Lake	x	x	x		x		x							
Rainbow Lake										x				
Richter Lake	x	x	x				x							
Robertson Lake	x										B			
Scythes Lake	x	x	x				x							
Sim Lake	x	x	x			x	x	x						
Sotkowy Lake								x						
Sulphide Lake	x	x	x			x	x				B			
Teneyche Lake	x	x	x				x							
Upises Lake	x	x	x				x							
Versailles Lake	x				x	x								
Wapassini Lake	x				x	x								

Table F-7 (cont.). Summary of available data relevant to the aquatic biological resources of the La Ronge Greenstone Belt.

	Fish	Plankton	Benthos	Macrophytes	Comm. Fish.	Comm. Fish Quota	Test Netted	Fish Hg Analysis	Fish Introductions	Fish Stocking	Outfitter Camp	Campground	Offal Counts	Sediment Analysis
Nemeiben Lake														
Bob Lake	x										T			
Clam Lake	x	x	x		x	x	x	x			B			
Morning Lake	x				x	x								
Nemeiben Lake	x	x	x		x	x	x	x			B	x	x	
Triveet Lake	x	x	x		x	x	x				B			
Montreal River														
Bigstone Lake	x				x	x								
Egg Lake	x				x									x
Hall Lake	x										D			
Hives Lake	x				x	x								
Montreal River			x											
Morin Lake	x				x	x		x						
Sikachu Lake	x					x								
Lac la Ronge														
Cycloid Lake	x	x	x				x							
Downton Lake	x							x	x	x	D			
Duck Lake	x	x	x				x							
Gosling Lake	x				x									
Hunter Bay	x				x						B			x
Lac la Ronge	x				x	x	x			x	B			
Lynx Lake	x	x	x			x	x							
Midway Lake	x	x	x				x							
Nunn Lake	x				x	x		x			D			
Powdrill Lake	x				x	x		x						
Toland Bay										x				
Keg Lake														
Cartier Lake	x										B			
Churchill River	x										B	x		
Drinking Lake	x	x	x	x	x	x	x	x			B			x
Drope Lake	x	x	x			x	x							
Irving Lake	x					x								
Iskawatikan Lake	x				x	x		x			T			
Keg Lake	x	x	x	x	x	x	x							x
Laonil Lake	x				x	x								
Nistowiak Lake	x	x	x		x	x	x	x			D			
Pine Lake									x					

Table F-7 (cont.). Summary of available data relevant to the aquatic biological resources of the La Ronge Greenstone Belt.

	Fish	Plankton	Benthos	Macrophytes	Comm. Fish.	Comm. Fish Quota	Test Netted	Fish Hg Analysis	Fish Introductions	Fish Stocking	Outfitter Camp	Campground	Offal Counts	Sediment Analysis
Planinshek Lake	x										T			
Pointer Lake	x										B			
Renton Lake								x						
Thomas Lake								x						
Trade Lake	x	x	x	x	x	x	x	x			D			x
Whitemoose River	x										D			

* B = base camp
D = day camp
T = both base and day camp

Table F-8. List of common and scientific names for fish in the La Ronge Greenstone Belt.

Common Name	**Scientific Name**
SALMONIDAE	
Lake cisco	*Coregonus artedii*
Lake whitefish	*C. clupeaformis*
Shortjaw cisco	*C. zenithicus*
Blackfin cisco	*C. nigripinnis*
Round whitefish	*Prosopium cylindraceum*
Lake trout	*Salvelinus namaycush*
Brook trout	*S. fontinalis*
Splake	*S. fontinalis* x *S. namaycush*
Arctic grayling	*Thymallus arcticus*
Rainbow trout	*Salmo gairdneri*
ESOCIDAE	
Northern pike	*Esox lucius*
HIODONTIDAE	
Goldeye	*Hiodon alosoides*
CYPRINIDAE	
Lake chub	*Couesius plumbeus*
Fathead minnow	*Pimephales promelas*
Emerald shiner	*Notropis atherinoides*
Blacknose shiner	*N. heterolepis*
Spottail shiner	*N. hudsonius*
Flathead chub	*Platygobio gracilis*
Longnose dace	*Rhinichthys cataractae*
Pearl dace	*Semotilus margarita*
CATOSTOMIDAE	
Longnose sucker	*Catostomus catostomus*
White sucker	*C. commersoni*
Shorthead redhorse	*Moxostoma macrolepidotum*
GADIDAE	
Burbot (ling, maria)	*Lota lota*

Table F-8 (cont'd). List of common and scientific names for fish in the La Ronge Greenstone Belt.

Common Name	**Scientific Name**
PERCOPSIDAE	
Trout-perch	*Percopsis omiscomaycus*
GASTEROSTEIDAE	
Brook stickleback	*Culaea inconstans*
Ninespine stickleback	*Pungitius pungitius*
PERCIDAE	
Yellow perch	*Perca flavescens*
Walleye	*Stizostedion vitreum vitreum*
Sauger	*S. canadense*
Logperch	*Percina caprodes*
Johnny darter	*Etheostoma nigrum*
Iowa darter	*E. exile*
COTTIDAE	
Slimy sculpin	*Cottus cognatus*
Spoonhead sculpin	*C. ricei*
Deepwater sculpin	*Myoxocephalus quadricornis*

Table F-9. List of waterbodies and fish species known to occur in the the La Ronge Greenstone Belt.

	Northern Pike	Lake Trout	Walleye	Arctic Grayling	Yellow Perch	Lake Whitefish	Round Whitefish	Lake Cisco	Shortjaw Cisco	Blackfin Cisco	Burbot	White Sucker	Longnose Sucker	Shorthead Redhorse	Lake Chub	Longnose Dace	Emerald Shiner	Spottail Shiner	Blacknose Shiner	Trout-Perch	Brook Stickleback	Ninespine Stickleback	Slimy Sculpin	Spoonhead Sculpin	Deepwater Sculpin	Fathead Minnow	Sauger	Logperch	Johnny Darter	Iowa Darter	Rainbow Trout	Brook Trout	Splake
CHURCHILL RIVER DRAINAGE BASIN																																	
1. REINDEER R.																																	
Hickson Lake																																	
Asiski Lake	x	x																															
Deception Lake	x	x	x			x																											
Hickson Lake	x	x				x																											
Hook Lake		x				x																											
Jewett Lake	x	x	x			x																											
Macoun Lake	x	x				x																											
Maribelli Lake	x	x	x			x																											
Missi Lake	x	x	x			x																											
Oneman Lake	x	x				x																											
Numabin Bay																																	
Fleming Lake	x	x				x																											
Henry Lake	x	x				x																											
Reindeer Lake	x	x	x	x	x	x	x	x	x	x	x	x	x		x		x	x		x		x	x	x	x				x				
Sucker Lake	x	x				x																											
Harriott River																																	
Fafard Lake	x		x		x	x		x			x						x	x		x		x	x						x				
Gladman Lake	x	x				x																											
Wapiskaw/Reindeer Rivers																																	
Berney Lake		x																															
Brabant Lake	x		x		x	x		x			x	x	x		x			x	x	x		x	x		x					x			
Buch[illegible]n Lake	x	x	x			x																											
Burn[illegible]ke			x																														
Calder Lake	x	x	x			x																											

Table F-9 (cont.). List of waterbodies and fish species known to occur in the the La Ronge Greenstone Belt.

	Northern Pike	Lake Trout	Walleye	Arctic Grayling	Yellow Perch	Lake Whitefish	Round Whitefish	Lake Cisco	Shortjaw Cisco	Blackfin Cisco	Burbot	White Sucker	Longnose Sucker	Shorthead Redhorse	Lake Chub	Longnose Dace	Emerald Shiner	Spottail Shiner	Blacknose Shiner	Trout-Perch	Brook Stickleback	Ninespine Stickleback	Slimy Sculpin	Spoonhead Sculpin	Deepwater Sculpin	Fathead Minnow	Sauger	Logperch	Johnny Darter	Iowa Darter	Rainbow Trout	Brook Trout	Splake
Copp Lake	x	x	x			x																											
Hornet Lake	x	x	x			x																											
Iskwatam Lake	x	x	x			x																											
Jaysmith Lake	x																														S	S	
Kakabigish L.	x	x	x			x																											
Kelly Lake	x	x				x																											
Kenwood Lake	x	x	x			x																											
Laird Lake	x	x	x			x																											
May Lake		x				x																											
Nayelles Lake	x	x				x																											
Nistoassini L.	x	x	x			x																					x						
Ray Lake	x	x	x			x																											
Reindeer River	x		x	x	x																												
Royal Lake	x	x	x		x		x	x			x	x	x					x		x		x	x				x	x	x				
Settee Lake	x	x	x			x																											
Steephill Lake	x		x		x	x		x			x	x	x				x	x		x		x	x			x	x	x	x				
Waddy Lake	x	x	x			x																											
White Lake	x		x			x																											
Wierzycki L.	x	x			x	x		x			x	x			x				x	x													
Windrum Lake		x				x																											
2. CHURCHILL R.																																	
Foster River																																	
Eulas Lake	x	x	x			x																											
Nagle Lake	x	x	x			x																											

Table F-9 (cont.). List of waterbodies and fish species known to occur in the the La Ronge Greenstone Belt.

	Northern Pike	Lake Trout	Walleye	Arctic Grayling	Yellow Perch	Lake Whitefish	Round Whitefish	Lake Cisco	Shortjaw Cisco	Blackfin Cisco	Burbot	White Sucker	Longnose Sucker	Shorthead Redhorse	Lake Chub	Longnose Dace	Emerald Shiner	Spottail Shiner	Blacknose Shiner	Trout-Perch	Brook Stickleback	Ninespine Stickleback	Slimy Sculpin	Spoonhead Sculpin	Deepwater Sculpin	Fathead Minnow	Sauger	Logperch	Johnny Darter	Iowa Darter	Rainbow Trout	Brook Trout	Splake
Black Bear Island																																	
Allan Lake	x	x																															
Barker Lake	x		x			x									x												x						
Bartlett Lake	x	x	x					x			x	x	x		x							x	x										
Bellows Lake	x		x			x																											
Besnard Lake	x		x		x	x		x				x					x	x		x	x	x	x	x		x		x					
Black Bear Is.	x		x			x																											
Campbell Lake	x	x	x			x																											
Churchill R.	x	x	x			x																					x						
David Lake	x				x						x	x										x											
Devil Lake	x		x			x																					x						
Fitzpatrick L.	x		x			x																											
Forbes Lake	x	x	x			x																											
Hepburn Lake	x	x	x			x																											
Hollowell Lake	x	x	x			x																											
Kavanagh Lake	x	x	x			x																											
Keith Lake	x	x	x			x																											
Kenyon Lake	x	x	x			x																											
Kinosaskaw L.	x		x			x																											
Larocque Lake	x	x	x			x																											
Larson Lake	x	x	x			x																											
Little Crooked	x		x			x																											
Mallard Lake	x				x	x						x																					
McGunigal Lake	x		x																														
McIntosh Lake	x	x	x		x	x		x			x	x	x			x	x	x		x		x	x					x	x				
McTavish Lake	x	x	x			x																											
Melan[illegible]n Lake	x		x																														
Moun[illegible] Lake	x		x			x																											

Table F-9 (cont.). List of waterbodies and fish species known to occur in the the La Ronge Greenstone Belt.

	Northern Pike	Lake Trout	Walleye	Arctic Grayling	Yellow Perch	Lake Whitefish	Round Whitefish	Lake Cisco	Shortjaw Cisco	Blackfin Cisco	Burbot	White Sucker	Longnose Sucker	Shorthead Redhorse	Lake Chub	Longnose Dace	Emerald Shiner	Spottail Shiner	Blacknose Shiner	Trout-Perch	Brook Stickleback	Ninespine Stickleback	Slimy Sculpin	Spoonhead Sculpin	Deepwater Sculpin	Fathead Minnow	Sauger	Logperch	Johnny Darter	Iowa Darter	Rainbow Trout	Brook Trout	Splake
Nipew Lake	x		x			x																											
Paull Lake	x	x	x			x																											
Rottenstone	x	x	x			x																											
Roudish Lake	x	x				x																											
Sandy River	x	x				x																											
Shadd Lake	x	x	x			x																											
Star Lake	x	x			x	x					x	x																					
Sunday Lake	x											x																					
Trout Lake	x		x		x	x		x			x	x	x	x				x			x		x			x	x	x		x			
Otter Lake																																	
Althouse Lake	x				x							x																					
Baldhead Lake	x					x																											
Berna Lake				S																											S		
Bevern Lake	x	x	x			x																											
Bielby Lake	x				x	x						x			x								x										
Churchill R.	x	x	x			x																					x						
Colin Lake	x	x	x			x																											
Contact Lake	x	x	x		x	x		x			x	x			x					x		x	x		x					x			
Cote Lake	x																																
Davis Lake	x	x	x		x	x		x			x	x			x					x		x	x										
Dickens Lake	x	x	x		x	x		x			x	x			x					x		x								x			
Feldspar Lake																															S		
Five Fingers L	x																														S	S	
Freda Lake	x		x			x																											
Freestone Lake	x					x																											
Glennie Lake		x	x			x																											
Hebden Lake	x	x	x		x	x		x			x	x																		x			

Table F-9 (cont.). List of waterbodies and fish species known to occur in the the La Ronge Greenstone Belt.

	Northern Pike	Lake Trout	Walleye	Arctic Grayling	Yellow Perch	Lake Whitefish	Round Whitefish	Lake Cisco	Shortjaw Cisco	Blackfin Cisco	Burbot	White Sucker	Longnose Sucker	Shorthead Redhorse	Lake Chub	Longnose Dace	Emerald Shiner	Spottail Shiner	Blacknose Shiner	Trout-Perch	Brook Stickleback	Ninespine Stickleback	Slimy Sculpin	Spoonhead Sculpin	Deepwater Sculpin	Fathead Minnow	Sauger	Logperch	Johnny Darter	Iowa Darter	Rainbow Trout	Brook Trout	Splake
Hine Lake	x				x						x	x			x								x										
Hunt Lake	x		x			x																											
Italy Lake																																S	
Kemp Lake	x	x	x			x																											
Kliman Lake	x		x			x																											
Kuskawao Lake	x				x							x										x	x										
Little Deer	x		x		x	x		x			x	x			x							x	x										
Lussier Lake																																S	
MacKay Lake	x	x	x		x	x		x			x	x			x							x	x		x					x			
MacLean Lake	x	x	x			x																											
McComb Lake	x	x				x																											
McLennan Lake	x	x	x			x		x			x	x			x					x		x	x		x					x			
McNichol Lake	x		x			x		x															x										
Mekewap Lake	x					x																	x								S		
Minuhik Lake	x	x	x			x																											
Mountain Lake	x		x		x	x		x				x	x	x	x	x		x		x	x	x	x			x	x			x			
Mullock Lake																															S		S
Naniskak E L.					x																										S		
Naniskak W L.				x	x																										S		
Otter Lake	x		x		x	x		x			x	x	x	x	x	x	x	x		x			x			x	x						
Pechey Lake	x		x		x	x		x			x																	x					
Poulton Lake	x				x							x											x										
Preview Lake	x				x	x						x																		x			
Rainbow Lake																															S	S	
Richter Lake	x																																
Robertson Lake	x	x	x			x																											
Scyth Lake	x		x			x																											
Sim	x		x		x							x						x		x													

Table F-9 (cont.). List of waterbodies and fish species known to occur in the the La Ronge Greenstone Belt.

	Northern Pike	Lake Trout	Walleye	Arctic Grayling	Yellow Perch	Lake Whitefish	Round Whitefish	Lake Cisco	Shortjaw Cisco	Blackfin Cisco	Burbot	White Sucker	Longnose Sucker	Shorthead Redhorse	Lake Chub	Longnose Dace	Emerald Shiner	Spottail Shiner	Blacknose Shiner	Trout-Perch	Brook Stickleback	Ninespine Stickleback	Slimy Sculpin	Spoonhead Sculpin	Deepwater Sculpin	Fathead Minnow	Sauger	Logperch	Johnny Darter	Iowa Darter	Rainbow Trout	Brook Trout	Splake
Sulphide Lake	x		x		x	x		x				x										x	x										
Teneyche Lake	x										x	x											x										
Upises Lake	x																																
Versailles L.	x	x	x			x																											
Wapassini Lake		x				x																											
Nemeiben Lake																																	
Bob Lake	x	x				x																											
Clam Lake	x		x			x		x			x	x					x	x		x			x			x							
Morning Lake	x		x			x																											
Nemeiben Lake	x	x	x		x	x		x			x	x	x		x	x		x	x	x	x	x	x			x							
Triveet Lake	x		x			x		x			x	x					x	x		x			x			x							
Montreal River																																	
Bigstone Lake	x		x		x	x		x			x	x	x																				
Egg Lake	x	x	x			x																					x						
Hall Lake	x		x			x																											
Hives Lake	x		x																														
Morin Lake	x	x	x			x																											
Sikachu Lake	x		x			x																											
Lac la Ronge																																	
Downton Lake	x		x	S	x	x					x	x	x	x	x	x	x	x		x	x	x	x			x	x	x		x	S		
Duck Lake		x																															
Gosling Lake	x	x	x			x																											
Hunter Bay	x	x	x			x																											
Lac la Ronge	x	x	x	S	x	x		x			x	x	x		x	x		x	x	x	x	x	x		x					x			

Table F-9 (cont.). List of waterbodies and fish species known to occur in the the La Ronge Greenstone Belt.

	Northern Pike	Lake Trout	Walleye	Arctic Grayling	Yellow Perch	Lake Whitefish	Round Whitefish	Lake Cisco	Shortjaw Cisco	Blackfin Cisco	Burbot	White Sucker	Longnose Sucker	Shorthead Redhorse	Lake Chub	Longnose Dace	Emerald Shiner	Spottail Shiner	Blacknose Shiner	Trout-Perch	Brook Stickleback	Ninespine Stickleback	Slimy Sculpin	Spoonhead Sculpin	Deepwater Sculpin	Fathead Minnow	Sauger	Logperch	Johnny Darter	Iowa Darter	Rainbow Trout	Brook Trout	Splake
Lynx Lake	x		x		x						x	x											x										
Midway Lake	x				x						x	x											x										
Nunn Lake	x	x	x			x																											
Powdrill Lake	x		x			x																											
Toland Bay																																S	
Keg Lake																																	
Cartier Lake	x	x	x			x																											
Churchill R.	x	x	x			x																					x						
Drinking Lake	x		x		x	x		x			x	x	x	x	x	x	x	x		x	x	x	x			x	x	x		x			
Drope Lake	x		x		x	x		x			x	x		x	x	x		x		x			x			x	x						
Irving Lake	x		x			x																											
Iskawatikan L.	x	x	x			x																											
Keg Lake	x	x	x		x	x		x			x	x	x	x	x	x	x	x		x	x	x				x	x	x		x			
Laonil Lake	x	x				x																											
Nistowiak Lake	x		x		x	x		x				x	x	x	x	x		x		x			x			x	x						
Pine Lake				S																													
Planinshek L.	x	x	x			x																											
Trade Lake	x		x		x	x					x	x	x	x		x	x	x		x	x	x		x		x	x	x		x			
Whitemoose	x		x																														

S = stocked or introduced species

Table F-10. Relative abundance as percentage of fish captured in standard gang gill nets and a comparison of average standard gang gillnet catches from the La Ronge Greenstone Belt.

	NP*	Wy	LW	LT	Number/ Net Set	W't(kg)/ Net Set	No. of Sets
1. REINDEER R.							
Numabin Bay							
Reindeer Lake	2.6	2.9	54.4	16.8	68	46.3	44
Harriott River							
Fafard Lake	9.8	24.6	18.6		87.3	52.1	8
Wapiskaw/Reindeer							
Brabant Lake	10.5		2.6		192.0	83.8	10
Royal Lake	15.9	15.1	9.5		83.4	56.7	8
Steephill Lake	12.1	10.8	2.4		173.9	65.9	8
The Two Rivers	11.1	16.4	7.9		80.3	39.7	8
Wierzycki Lake	9.8		68.6	5.3	59.3	39.2	6
2. CHURCHILL R.							
Black Bear Island							
Bartlett Lake			49.0	10.0	50.3	55.9	3
Besnard Lake	8.5	25.5	9.4		135.7	79.9	17
McIntosh Lake	2.6	21.5	27.1	0.6	117.3	65.0	4
Trout Lake	2.6	28.7	10.9		153.3	77.7	4
Otter Lake							
Althouse Lake	50.0				4.0	3.8	1
Baldhead Lake			44.0		9.0	3.4	1
Bielby Lake	11.0		80.0		135.0	58.5	2
Contact Lake	6.4	5.0	37.0	0.6	71.9	42.6	7
Cote Lake					25.0	18.3	1
Davis Lake	1.8		32.8	11.8	36.7	22.3	3
Dickens Lake	5.8		35.9	1.9	76.7	29.0	7
Five Fingers Lake	100				1.9	2	
Haugen Lake			69.0	16.0	37.3	33.2	3
Hebden Lake	10.1		42.8	2.3	43.4	23.4	5
Hine Lake	41.0				14.5	10.3	2
Kuskawao Lake	27.0				37.5	25.1	2
Little Deer Lake	2.0	10.3	48.8		101.5	105.9	4
Lussier Lake	100				7.2	2	
MacKay Lake	3.8		36.4	30.9	23.9	19.4	10
McComb Lake	4.0		96.0		50.9	1	
Mekewap Lake			96.0		81.5	56.2	2
McLennan Lake	1.3		42.2	13.3	26.2	13.1	12
McNichol Lake	12.0	30.0	11.0		132.5	83.0	2

Table F-10 (cont.)* Relative abundance as percentage of fish captured in standard gang gill nets and a comparison of average standard gang gillnet catches from the La Ronge Greenstone Belt.

	NP	Wy	LW	LT	Number/ Net Set	W't(kg) Net Set	No. of Sets
Mountain Lake	3.4		19.0		98.3	51.8	3
Mullock Lake	73.0				6.5	4.4	4
Naniskak E Lake	79.0				6.3	2.3	3
Naniskak W Lake	100				3.9	2	
Otter Lake	10.0		2.2		148.3	116.2	6
Pechey Lake			36.0		159.0	85.6	1
Poulton Lake	15.0				13.0	4.2	1
Preview Lake	18.0		35.0		54.7	41.4	3
Richter Lake	45.0				10.3	6.8	3
Scythes Lake	9.0		24.0		212.0	206.6	1
Sim Lake	15.0	11.0			111.0	56.9	2
Sulphide Lake	10.4	11.6	22.0		79.9	59.3	5
Teneyche Lake	35.0				53.0	37.6	
Upises Lake	77.0				13.0	4.4	1
Nemeiben Lake							
Clam Lake	4.9	24.2	15.4		312.0	160.5	3
Nemeiben Lake	11.6	24.3	10.5	0.1	90.1	49.6	23
Triveet Lake	8.3	17.8	19.7		272.0	194.3	2
Lac la Ronge							
Cycloid Lake					0.0	1	
Duck Lake	56.0				61.0	39.8	1
Hunter Bay	2.4	4.9	60.6	4.8	95.0	57.2	15
Lac la Ronge	1.4	0.1	40.3		163.0	70.8	53
Lynx Lake	32.0				33.7	30.3	3
Midway Lake	18.0	76.0			78.0	48.8	1
Keg Lake							
Drinking Lake	10.3	14.2	9.4		165.8	102.5	8
Keg Lake	8.6	14.6	4.4		88.9	69.4	8
Nistowick/Drope	4.1		8.0		166.4	102.2	12
Trade Lake	22.5	12.6	8.7		73.3	41.2	8

* NP = northern pike
Wy = walleye
LW = lake whitefish
LT = lake trout

Table F-11. Summary of Saskatchewan commercial catch records for lakes within the La Ronge Greenstone Belt.

	Period of Record	Average Weight(kg)/Species/Year*						No. Licensed In Last Year Fished	
		Lake Whitefish	Lake Trout	Walleye	Northern Pike	Other	Years	No.	Year
CHURCHILL RIVER DRAINAGE BASIN									
1. REINDEER R.									
Hickson Lake									
Deception Lake	1965-1966	43	160	13	25		1	3	1965-66
Hook Lake	1952-1953	1048	260				1	5	1952-53
Jewett Lake	1960-1981	2571	1462	9	383	19	5	2	1980-81
Macoun Lake	1959-1985	3860	2258		434	5	5	3	1984-85
Maribelli Lake	1959-1981	703	1023	25	37		5	2	1980-81
Numabin Bay									
Fleming Lake	1974-1982	163	116		139	0	3	1	1981-82
Henry Lake	1964-1985	618	221		8		4	1	1984-85
Reindeer Lake	1941-1985	144322	151121	7857	38420	216	5	41	1984-85
Sucker Lake	1969-1970	699	162		8		1	3	1969-70
Wapiskaw/Reindeer Rivers									
Berney Lake	1984-1985	150	133				1	1	1984-85
Burnt Lake	1984-1985	100		50			1	1	1984-85
Copp Lake	1957-1958	421	228		13		1	1	1957-58
Iskwatikan Lake	1945-1985	240	136	1800	505	70	5	1	1984-85
Kakabigish Lake	1965-1966				7149		1	1	1965-66
Kelly Lake	1970-1975		95				2	1	1974-75
Laird Lake	1960-1973	1951	1158	130	155		5	3	1972-73
May Lake	1971-1980	175	130				2	1	1979-80

Table F-11 (cont.). Summary of Saskatchewan commercial catch records for lakes within the La Ronge Greenstone Belt.

		Average Weight(kg)/Species/Year*						No. Licensed In Last Year Fished	
	Period of Record	Lake Whitefish	Lake Trout	Walleye	Northern Pike	Other	Years	No.	Year
Reindeer River	1966-1985	83	6	192	226		3	2	1984-85
Royal Lake	1971-1980	1509	32	209	467	3	5	2	1979-80
Settee Lake	1961-1981	791	778	14				1	1980-81
Steephill Lake	1962-1985	673	1	2358	791	14	5	3	1984-85
Waddy Lake	1969-1982	229	220		98		3	1	1981-82
White Lake	1972-1984	55		169	149		3	1	1983-84
Wierzycki Lake	1973-1975							2	
Windrum Lake	1965-1967	663	2195					1	1966-67
2. CHURCHILL R.									
Foster River									
Eulas Lake	1970-1973	34	3	149	17		2	2	1972-73
Nagle Lake	1978-1979						1	1	1978-79
Black Bear Island									
Besnard Lake	1942-1985	10984		13365	8781	12	5	3	1984-85
Black Bear Island	1941-1985	12408		1975	795	26	5	7	1984-85
Campbell Lake	1959-1984	759	315	88	45	0	4	2	1972-73
Forbes Lake	1961-1982	1229	300	205	3	1	5	1	1981-82
Hepburn Lake	1954-1985	159	143	98	68	10	5	2	1984-85
Keith Lake	1963-1984	1391	202		27		5	2	1983-84
Kenyon Lake	1963-1964	173	500		299		1	2	1963-64
McIntosh Lake	1942-1985	96	26	23	68	4	5	2	1984-85
Nipew Lake	1951-1985	811		280	177	59	5	1	1984-85

Table F-11 (cont.). Summary of Saskatchewan commercial catch records for lakes within the La Ronge Greenstone Belt.

	Period of Record	Average Weight(kg)/Species/Year*						No. Licensed In Last Year Fished	
		Lake Whitefish	Lake Trout	Walleye	Northern Pike	Other	Years	No.	Year
Paull Lake	1960-1985	464	77	359	35	8	5	1	1984-85
Rottenstone Lake	1957-1958	568	425	50	67		1	1	1957-58
Trout Lake	1950-1985	3578	5	585	383	106	5	4	1984-85
Otter Lake									
Colin Lake	1961-1962	770	348				1	5	1961-62
Contact Lake	1942-1979	375	5	59	3		5	2	1978-79
Davis Lake	1948-1981	360	193		18	1	5	1	1980-81
Dickens Lake	1959-1975	153	52				2	2	
Glennie Lake	1961-1983	723	419			1	3	1	1982-83
MacLean Lake	1969-1985	274	156		11	9	4	1	1984-85
McLennan Lake	1971-1985	617	106		50		5	1	1984-85
Mountain Lake	1962-1985	7001		706	471		5	4	1984-85
Otter Lake	1951-1985	864		335	200		5	2	1984-85
Versailles Lake	1965-1985	360	179	475	36		3	1	1984-85
Wapassini Lake	1961-1962	876	1242				1		1961-62
Nemeiben Lake									
Clam Lake	1942-1985	1886		225	917	2	5	5	1984-85
Morning Lake	1942-1985	2243		604	173	384	5	4	1984-85
Nemeiben Lake	1941-1985	1464	328	3021	1933	17	5	4	1984-85
Triveet Lake	1942-1968							7	

Table F-11 (cont.). Summary of Saskatchewan commercial catch records for lakes within the La Ronge Greenstone Belt.

	Period of Record	Average Weight(kg)/Species/Year*						No. Licensed In Last Year Fished	
		Lake Whitefish	Lake Trout	Walleye	Northern Pike	Other	Years	No.	Year
Montreal River									
Bigstone Lake	1941-1985	4071		307	86	1738	5	5	1984-85
Egg Lake	1941-1985	16792	2	2029	488	3099	5	5	1984-85
Hives Lake	1980-1985			3	12	114	2	1	1980-81
Morin Lake	1958-1985	17	370	26	260		5	1	1984-85
Lac la Ronge									
Gosling Lake	1969-1981	252	24	42	2		2	1	1980-81
Hunter Bay	1945-1985	20446	3400	1417	363	139	5	7	1984-85
Lac la Ronge	1941-1985	33502	15672	15359	9672	434	5	21	1984-85
Nunn Lake	1943-1985	535	89	777	290		5	2	1984-85
Powdrill Lake	1951-1985	361		160	35		5	1	1984-85
Keg Lake									
Drinking Lake	1951-1985	2312		906	89		5	1	1984-85
Keg Lake	1971-1985	1942		264	239		4	2	1984-85
Laonil Lake	1969-1970	458	39		450		1	2	1969-70
Nistowiak Lake	1951-1985	861		426	381	3	5	1	1984-85
Planinshek Lake	1957-1963	829	687		9		3	2	1962-63
Trade Lake	1952-1985	1513		8096	5979	136	5	13	1984-85

* where period of record extended past 5 years, only the last 5 years were used in the calculation of average catch

Table F-12. Habitat and sensitive periods of the important sport and commercial fish species found in the La Ronge Greenstone Belt.

SPECIES	GENERAL HABITAT	SPAWNING HABITAT & TIMING	SENSITIVE PERIOD
Northern Pike	Usually found in shallow well vegetated areas of rivers or lakes	Vegetated shallows or flooded areas of lakes and rivers. Spawning occurs in spring just after ice out. After hatching young remain in vegetated shallows.	May to July
Walleye	Lakes, rivers and large streams	Rapid areas in streams and shoals of lakes. Spawning occurs in spring shortly after ice out.	May to July
Lake Trout	Deep, cold lakes preferred	Clean rubble or boulders in lakes. Spawning occurs in the fall, eggs hatch in late winter.	mid September to May
Lake Whitefish	Deep, cool lakes and larger rivers	Usually gravel, rubble or sand in shallow lakes. Spawning occurs in the fall, eggs hatch in late winter early spring and fry remain near shore.	late October to May

Table F-13. Common aquatic & semiaquatic plants from the La Ronge Greenstone Belt.

Emergent & Shore Plants

- Ranunculaceae
    - *Ranunculus gmelinii*
    - *R. aquatilis*
    - *R. flammula*
- Sparaginaceae
    - *Sparganium angustifolium*
    - *S. multipedunculatum*
    - *S. fluctuans*
- Araceae
    - *Acorus calamus*
    - *Calla palustris*
- Juncaceae
    - *Juncus filiformis*
    - *J. brevicaudatus*
- Gramineae
    - *Calamagrostis inexpansa*
    - *C. neglecta*
    - *Glyceria borealis*
    - *G. grandis*
    - *Phragmites communis*
- Cyperaceae
    - *Scirpus validus*
    - *S. acutus*
    - *Eleocharis palustris*
    - *Carex atherodes*
    - *C. flava*
    - *C. chordorrhiza*
    - *C. crawfordii*
    - *C. disperma*
    - *C. magellanica*
    - *C. rostrata*
    - *C. vaginata*
    - *C. lenticularis*
    - *C. aquatilis*
    - *C. palustris*
    - *C. diandra*
    - *C. canascens*
    - *C. aurea*
    - *C. brunnescens*
- Other
    - *Potentilla palustris*
    - *Polygonum amphibium*
    - *Sium suave*
    - *Rorippa islandica*
    - *Hippuris vulgaris*
    - *Saggitaria cuneata*
    - *Typha latifolia*
    - *Equisetum fluviatile*
    - *Moss* spp.

Submerged

- *Nuphar variegatum*
- *Potamogeton zosterformis*
- *P. alpinus*
- *P. epihydrus*
- *P. richardsonii*
- *P. pusillus*
- *P. praelongus*
- *P. gramineus*
- *Utricularia vulgaris*
- *U. intermedia*
- *Ceratophyllum demersum*
- *Myriophyllum spicatum*
- *M. alterniflorum*
- *Lemna minor*
- *L. triculca*
- *Chara* spp.

Sources

1. Heilman-Ternier & Harms (1975)
2. Integrated Environmental Sciences (1986a).

Table F-14. Common benthic organisms found in the La Ronge Greenstone Belt.

Benthic Organisms

Insecta
- Diptera (flies & mosquitos)
  - Chironomidae
  - Ceratopogonidae
  - Tabanidae
  - Heleidae
  - Simulidae
- Trichoptera (caddis flies)
  - *Pigacophila* sp.
  - *Polycentropus* sp.
  - *Neureclipsis* sp.
  - *Agryphia* sp.
  - *Limnephilus* sp.
  - *Glyphotaelus* sp.
  - *Athripsodes* sp.
  - *Oecetes* sp.
  - *Helicopsyche borealis*
  - *Cheumatopsyche* sp.
  - *Molanna* sp.
- Coleoptera (beetles)
  - *Donacia* sp.
- Ephemeroptera (mayflies)
  - *Hexagenia* sp.
  - *Centroptilum* sp.
  - *Cloeon* sp.
  - *Siphlonurus* sp.
  - *Caenis* sp.
  - *Stenonema* sp.
  - *Leptophlebia* sp.
- Plecoptera (stoneflies)
- Neuroptera (spongilla flies)
- Megaloptera (alderflies)
  - *Sialis* sp.
- Lepidoptera (moths)
- Odonata (dragonflies & damselflies)
  - *Epilordalia* sp.
  - *Ishnura* sp.
  - *Aeshna* sp.

Arachnoidea
- Hydrachnidae (watermites)

Crustacea
- Amphipoda (scuds)
  - *Gammarus* sp.
  - *Hyalella* sp.
  - *Pontoporeia* sp.
- Ostracoda (clam shrimp)

Mollusca
- Pelicipoda (clams)
  - sphaeriidae (fingernail clams)
  - unionidae (clams)
- Gastropoda (snails)
  - planorbidae (orb snails)
  - valvatidae (round mouthed snails)
  - lymnaeidae (pond snails)

Nematomorpha (Gordian worms)

Annelida (segmented worms)
- oligochaeta (aquatic earth worms)
- hirudinea (leeches)

Nematoda (round worms)

Sources

Chen (1974a, 1974c); Cushing (1963, 1964); Dean (1975); Koshinsky (1964, 1965, 1968a, 1971b); Liaw & O'Connor (1975); Patalas & Salki (1975); Rawson (1959); Sawchyn (1975); Sawchyn & Kardash (1976).

Table F-15. Common zooplankton species found in the La Ronge Greenstone Belt.

Protozoa

- *Epistylis* sp.
- *Vorticella* sp.
- *Difflugia* sp.
- *Codonella* sp.
- *Euglypha* sp.
- *Mallomonas* sp.
- *Actinosphaerium* sp.

Rotifera

- *Asplanchna* sp.
- *Ephiphanes* spp.
- *Kellicottia* sp.
- *Keratella* sp.
- *Polyarthra* sp.
- *Trichocera* sp.
- *Felinia* sp.
- *conochilus* sp.
- *Monostyla* sp.
- *Asplanchora* sp.

Crustacea

- Calanoid Copepods
  - *Calanus* sp.
  - *Epischura lacustris*
  - *E. nevadensis*
  - *Heterocope septentrionalis*

  - *Limnocalanus macrurus*
  - *Senecella calandoines*
- Cyclopoid copepods
  - *Cyclops acutifer*
  - *C. bicuspidatus*
  - *C. vernalis*
  - *Eucyclops* sp.
  - *Diaptomus minutus*
  - *D. ashlandi*
  - *D. oregonensis*
  - *D. pribilofensis*
  - *D. sicilis*
  - *Mesocyclops edox*
- Cladocera
  - *Daphne retrocurva*
  - *D. longiremis*
  - *D. galeana mendotae*
  - *Diaphanosoma leuchtenbergianum*
  - *Bosmina longirostris*
  - *Chudorus sphaericus*
  - *Leptodora kindtii*
  - *Eubosmina longispina*
  - *Holopedium gibberum*
- Mysidacea
  - *Mysis relicta*
- Ostracoda

Sources

Chen (1974a, 1974c); Cushing (1963, 1964), Dean (1975), Koshinsky (1964, 1965, 1968a, 1971b); Liaw & O'Connor (1975); Patalas & Salki (1975); Rawson (1959); Sawchyn (1975); Sawchyn & Kardash (1976).

Table F-16. Common phytoplankton species found in the La Ronge Greenstone Belt.

Diatoms

Asterionella sp.
Melosira sp.
Fragillaria sp.
Synedra sp.
Navicula sp.
Cyclotella sp
Stephanodiscus sp.
Tabellaria sp.
Sarirella sp.

Chrysosphaerella sp.
Diatoma sp.
Coscinodiscus sp.
Dinobryon sp.
Mallomonas sp.
Peridinium sp.
Ankistrodesmus sp.
Novicule sp.
Glenodinium sp.
Gomphonema sp.
Uroglenopsis sp.
Cymatopleura sp.
Surirella sp.
Cymbella sp.
Gyrosigma sp.
Cocconeis sp.
Epithemia sp.
Rhizosolenia sp.

Green Algae

Staurastrum sp.
Spondylosium sp.
Pediastrum sp.
Tetraedron sp.
Scenedesmus sp.
Volvocaceae spp.
Arthrodesmus sp.
Spirogyra sp.
Cosmocladium sp.

Closterium sp.
Staurastrum sp.
Oocystis sp.
Quadrigula sp.
Pleurotaenium sp.
Euastrum sp.
Gymnozyga sp.

Yellow-green Algae

Dinobryon sp.
Ceratium sp.
Synura sp.

Blue-green Algae

Lyngbya sp.
Aphanizomenon sp.
Anabaena sp.
Microcystis sp.
Cylindrospermum sp.
Coelosphaerium sp.
Oscillatoria sp.
Chroococcaceae spp.
Merismopedia sp.
Gloetrichia sp.
Gomphosphaeria sp.
Chroococcus sp.

Sources

Chen (1974a, 1974c); Cushing (1963, 1964), Dean (1975), Koshinsky (1964, 1965, 1968a 1971b); Liaw & O'Connor (1975); Patalas & Salki (1975); Rawson (1959); Sawchyn (1975) Sawchyn & Kardash (1976).

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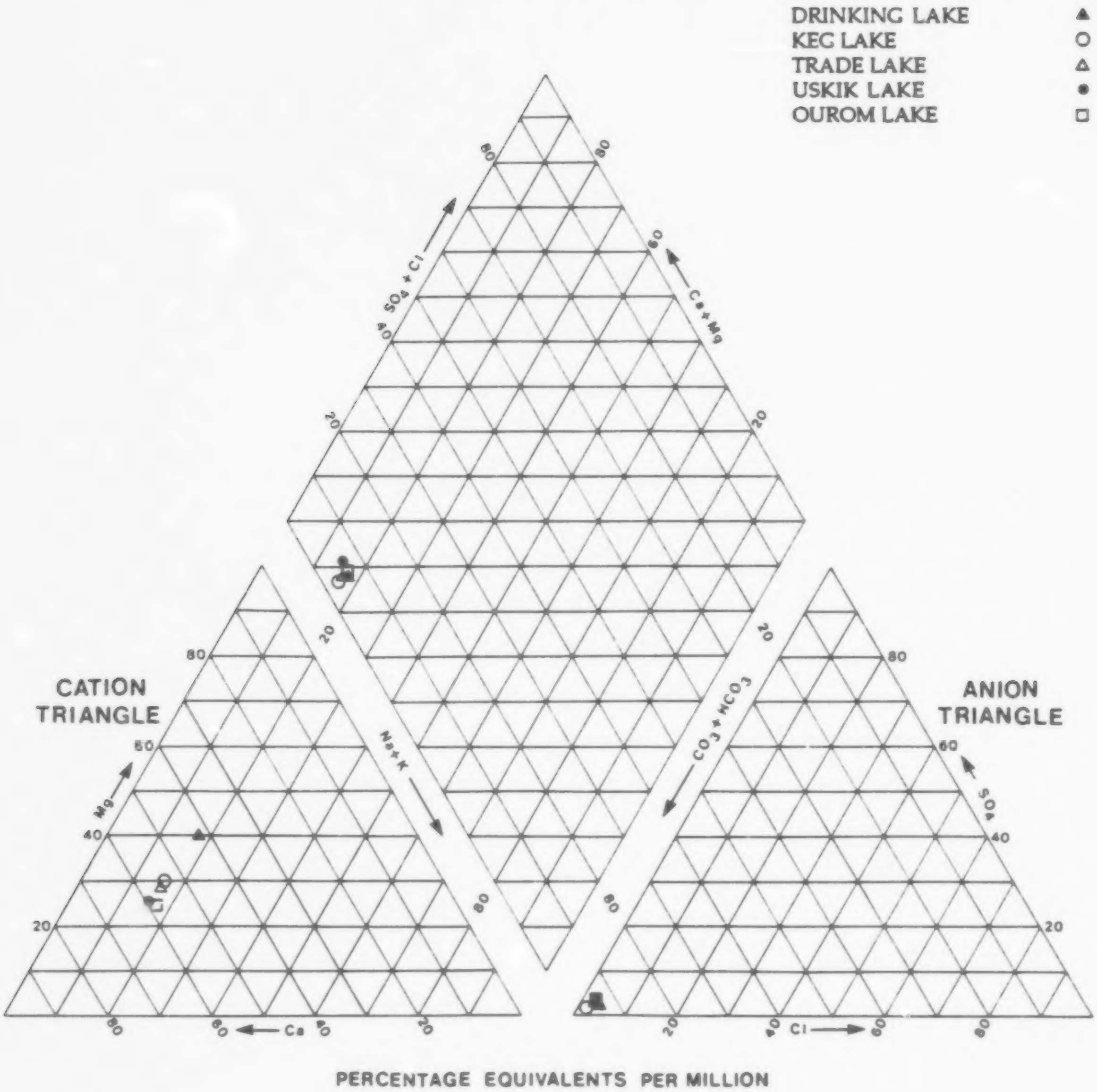


FIGURE F-1 CHURCHILL RIVER LAKES WATER QUALITY

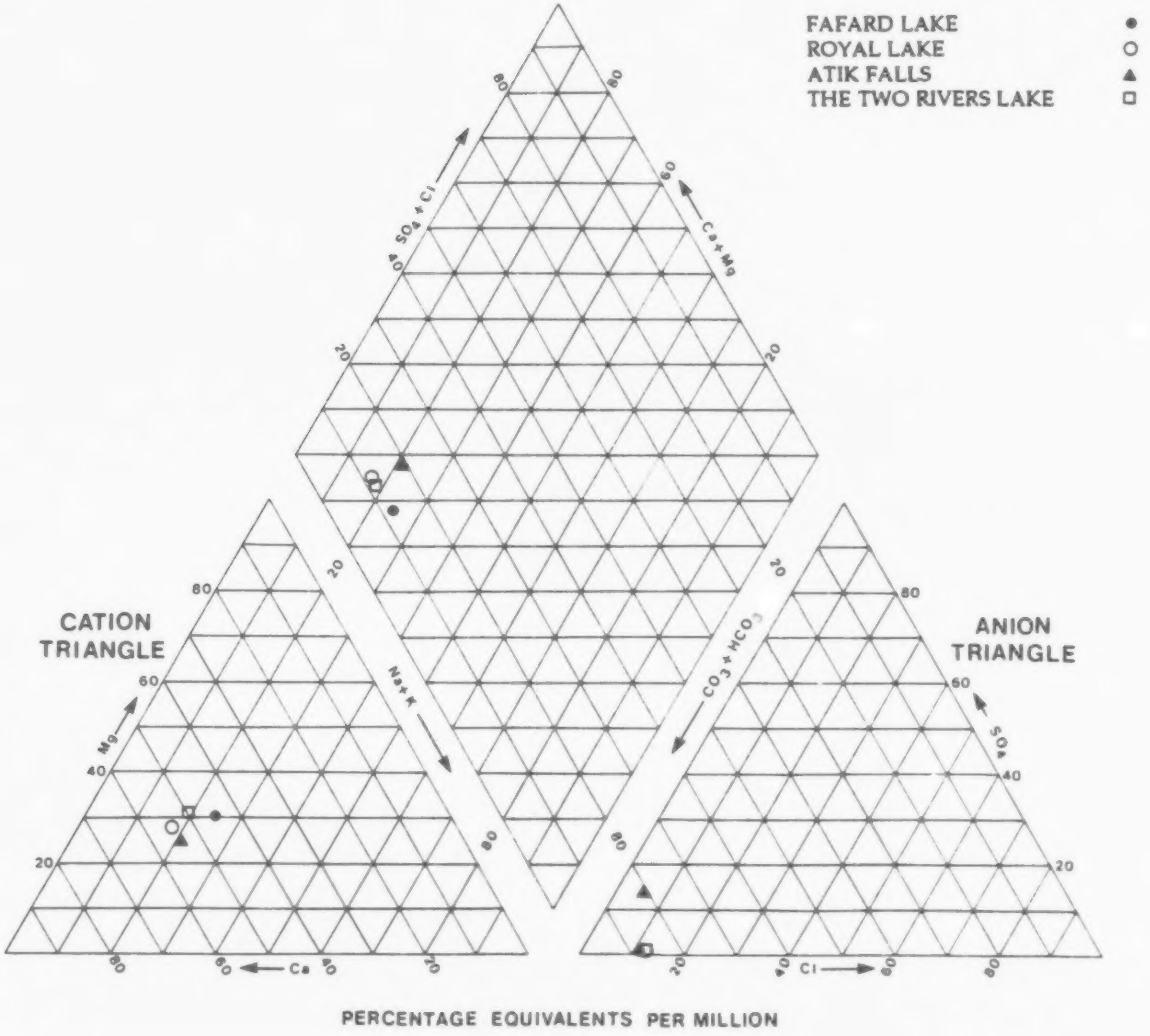


FIGURE F-2 REINDEER RIVER LAKES WATER QUALITY

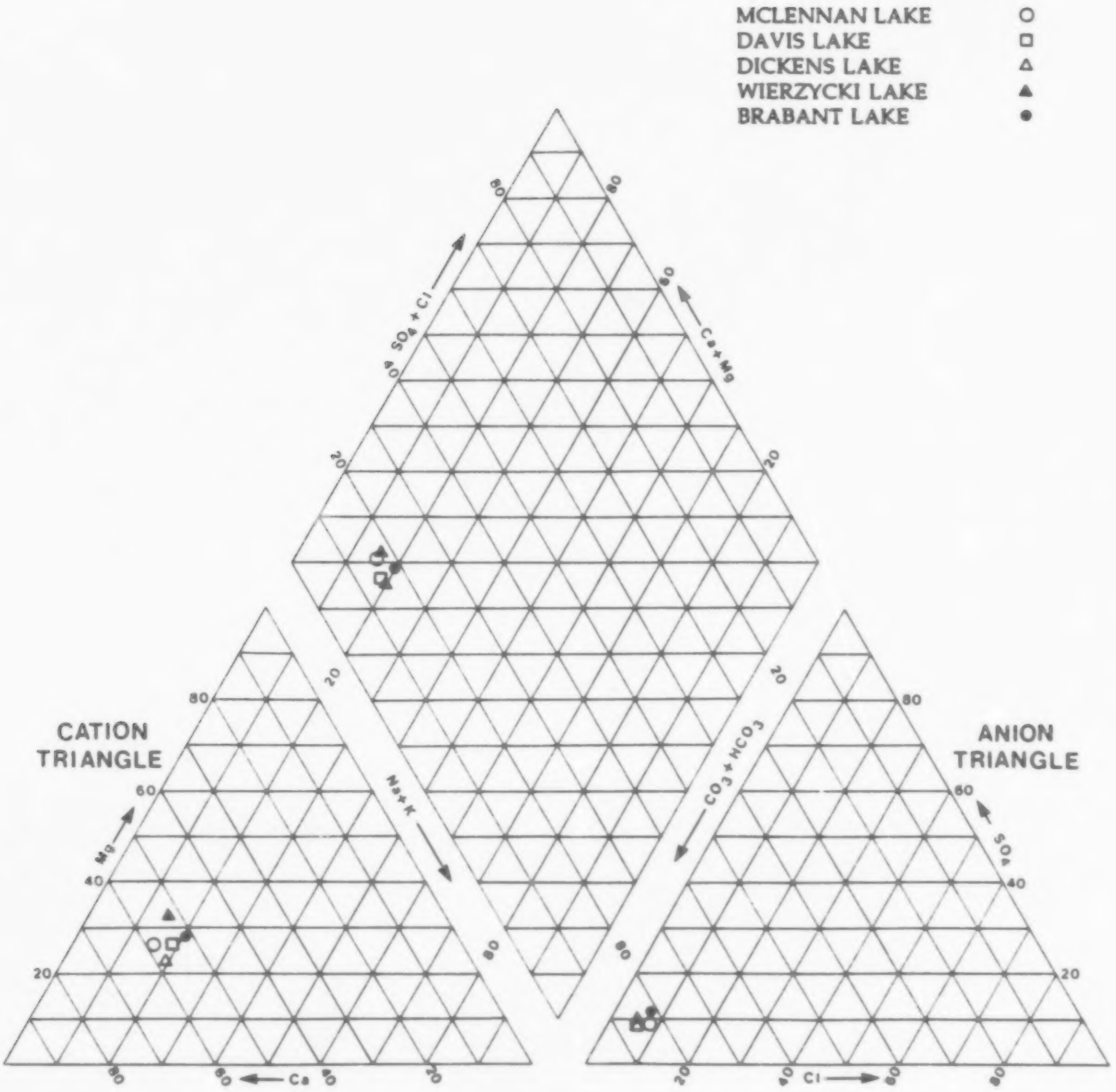
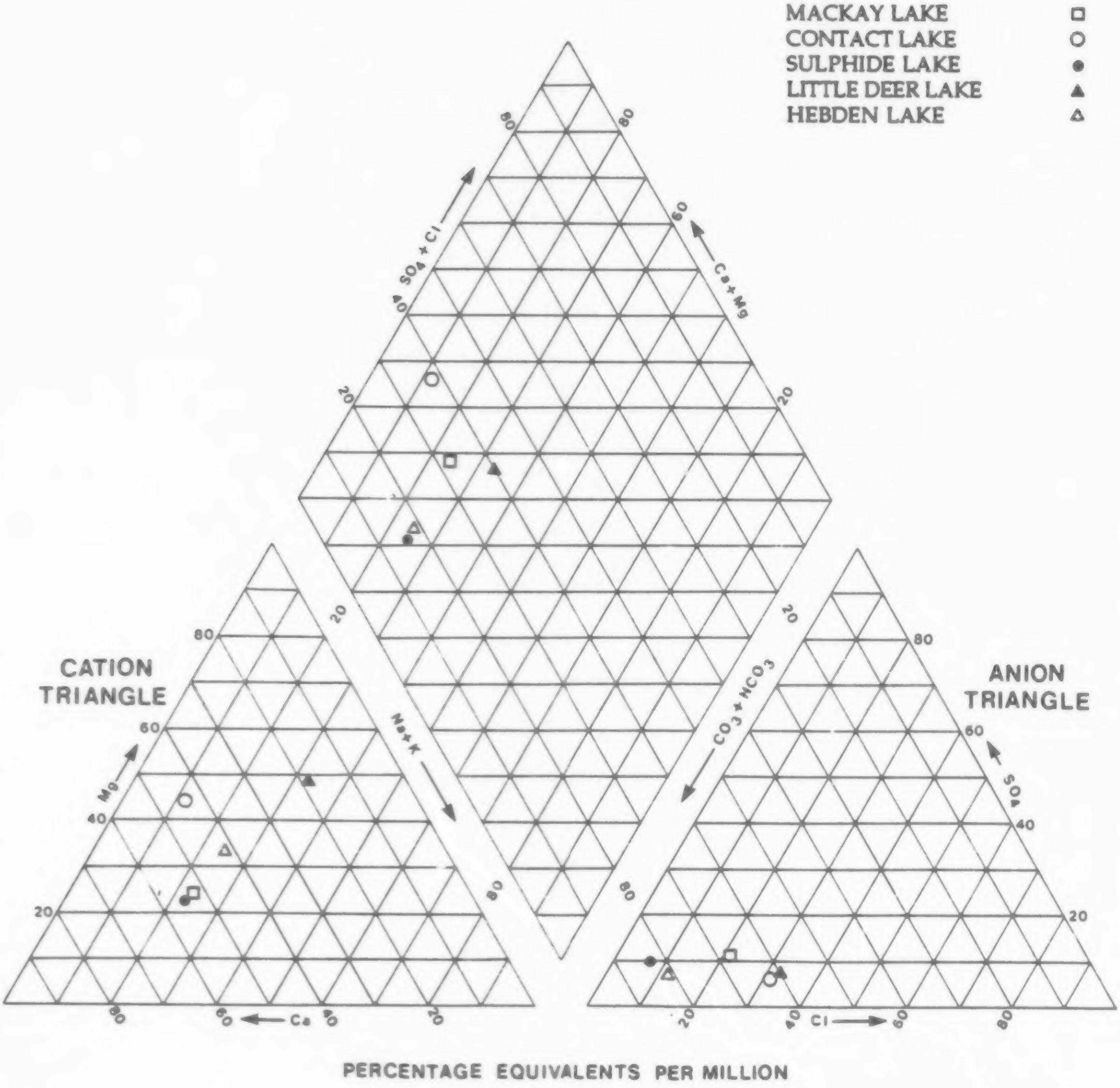


FIGURE F-3 WATER QUALITY FROM TECHNICAL REPORT 76-3



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SECTION G
SOCIO-ECONOMIC

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APPENDIX G-1. TABLES

1.0 INTRODUCTION

Activities related to the development of mineral resources in the Greenstone Belt will interact with the current socioeconomic regime in the area. The following section serves to define the parameters of that regime using available information.

2.0 COMMUNITIES AND SETTLEMENTS

The area encompasses a diverse population which is difficult to describe using existing data. The source of difficulty lies with the various methods by which data are grouped. The greatest handicap is with respect to describing the characteristics of residential groupings (settlements, etc.), as the administrative structure in the study area does not neatly conform to population clusters as is usually the case in southern areas.

There are 7 distinct population clusters in the study area (Table G-1) comprised of 13 different administrative units - 7 Indian Reserves and 6 urban municipalities/settlements as recognized by the Northern Municipalities Act (Sask. Statutes 1983).

The core area consists of the Town of La Ronge, the northern village of Air Ronge and the Kitsaki, Bigstone, Bell's Point and Far Reserve populations of the Lac La Ronge Band. Approximately 2 out of 3 study area residents are located in this core area. This population concentration is composed of different segments with varying northern, regional and local orientations. Generally, the original native trapping-fishing subsistence economy has been superceded by a regional commercial-tourist function and lastly by regional-northern mining-administrative commercial functions.

Stanley Mission, comprised of the populations in the Northern Hamlet of Stanley Mission and that of Stanley Indian Reserve 157, has basic community functions. Southend is of a similar nature being comprised of a Northern Hamlet and a Reserve. These communities have arisen out of the pattern of delivery of government services in the north. The economic base of these communities is not settlement oriented however.

Sucker River, Grandmother's Bay and Brabant Lake are native population aggregations rather than communities. As a group, these settlements have a high propensity toward traditional lifestyles and in this sense are functionally more relevant to their resource base than are the larger centers of Stanley Mission and Southend.

The northern hamlet of Missinipe is a tourist-based complex which is basically a tourist jumping-off point.

2.1 La Ronge

La Ronge is located on the northwest shore of Lac La Ronge, about 240 km north of Prince Albert on Highway 2. It is the major service center in northern Saskatchewan, houses regional administrative functions, is the hub of the northern tourist industry and is the major base for mineral exploration and development.

La Ronge has a well-developed infrastructure (Table G-2 and G-3). It has a sewer and water system, electrical power from the provincial grid system, and telephone and daily postal service. Daily scheduled flights link La Ronge with southern centers. There is daily bus service from Prince Albert and regular trucking service. CBC radio and television are received and re-transmitted. There is a hospital and medical clinic as well as public nursing services. There is a complete school system - kindergarten to Grade 12 - and a regional community college. Accommodation facilities include hotels, motels and tourist lodges. In addition to several churches there is a library, theatre, curling rink, skating rink, tennis court, marina, beach area and campground, and a recreation complex.

La Ronge by its very nature defies concise social analysis. The community is diverse, complex and dynamic, having many unique features. There is a core group of long-time white residents involved primarily in the tourist business and related services. This group was complemented by civil servants and their families during the years when the Department of Northern Saskatchewan was headquartered in La Ronge. While the original group of businessmen participated in the economic expansion resulting first from the Anglo-Rouyn Mine and then DNS, the opportunities also attracted newcomers to the area.

The native population of La Ronge is equally or perhaps even more diverse. Many of the Indian and Metis residents of La Ronge, and the majority of the treaty Indians from the adjacent reserves, pursue traditional resource-based activities such as trapping, commercial fishing, domestic fishing and hunting. Others participate on the full-time basis in wage employment activities, and an increasing number are engaged in business. A substantial number combine aspects of both lifestyles in various ways. Because of the range of services, administrative functions, employment/business opportunities concentrated in La Ronge, natives from other northern settlements are attracted to the community.

2.2 Air Ronge

Located south of the Montreal River and Kitsaki Reserve, Air Ronge is an increasingly important part of the La Ronge district (Table G-3). The area developed on a piecemeal basis over the years following the construction of the old airport and the nearby highway. Populated primarily by working people, it has generally been attractive to lower income groups as a less expensive place to live. Business development in Air Ronge has been substantial reflecting the availability of lower cost land in proximity to the highway. However, the community is more of a suburb of La Ronge than a separate community in its own right.

2.3 Lac La Ronge Indian Band

The Lac La Ronge Indian Band has 18 different reserves accounting for 107,000 acres. Several of the smaller reserves do not house any residents. The Kitsaki, Bigstone, Bell's Point and Far Reserve populations are part of the core area population. The Band has its headquarters on the Kitsaki Reserve although Stanley Mission also has a band office.

2.4 Sucker River

Sucker River is a small settlement eighteen miles northeast of La Ronge on Highway 102. The settlement itself is located in Reserve 156C. The economy is characterized by guiding, trapping and fishing with some degree of commuting off-reserve for wage employment. The infrastructure is not well-developed with a small school, regular garbage collection and electrical service providing a basic level of community services (Tables G-2 and G-3).

2.5 Stanley Mission

Stanley Mission is located on a point of land jutting into the Churchill River about 60 air miles north-east of La Ronge (Tables G-2 and G-3). It is the oldest permanently occupied settlement in Saskatchewan. An all-weather road joins the community to Highway 102 about 50 km north of La Ronge.

The economy of the community consists of a seasonal mix of government-funded wage labor, temporary private sector employment, and traditional renewable resource-based activities.

2.6 Missinipe

Missinipe is a tourist complex located on Otter Lake 80 km north of La Ronge on Highway 102 (Table G-3). It is primarily a jumping-off point for tourists flying into outlying lakes for sports fishing.

2.7 Grandmother's Bay

Grandmother's Bay is located on Otter Lake, close to Highway 102, about 67 km north of La Ronge. It is across the lake from the tourist center of Missinipe. The establishment of the settlement is attributed to a desire of some families to escape from the undesirable aspects of living in the larger community of Stanley Mission coupled with a wish to be situated closer to traditional hunting, trapping and fishing grounds.

Grandmother's Bay is connected to the provincial electrical grid. There is a small school, radio-telephone service and bi-weekly mail delivery (Table G-3). Plans are in place for connecting Grandmother's Bay to Highway 102 via an all season road.

2.8 Brabant Lake

Brabant Lake is situated on Highway 102 about 107 miles northeast of La Ronge (Table G-3). The settlement is of recent origin being relocated from a semi-permanent settlement existing on the lake prior to the building of the road. Like Grandmother's Bay, this settlement is populated by people originally based out of Stanley Mission motivated both by a desire to live without the pressure of a larger community and a desire for greater access to their resource base.

Although not a reserve, the majority of the residents have treaty status. The economy is strongly geared to trapping in the winter months with the majority of cash income arising out of short-term wage employment and a seasonal dependence on welfare.

2.9 Southend

Southend is located on the southern part of Reindeer Lake 225 km north of La Ronge on Highway 102 (Table G-3). Southend Reserve #200 is part of the lands of the Peter Ballantyne Band based out of Pelican Narrows which is made up of seven reserves encompassing about 22,500 acres. The reserve is separated from the hamlet by Reindeer Lake.

3.0 POPULATION GROWTH AND DISTRIBUTION

The two primary sources of data on northern populations are census data and data based on Saskatchewan Hospital Services Plan (SHSP) records. Census data are collected every five years by household enumerations (Table G-4). SHSP demographic data are based on the postal codes of those individuals issued a Saskatchewan Hospital Services Card. SHSP population data on communities are published annually (Table G-5).

The accompanying Table G-4 on study area settlement populations from 1941 to 1981, identifies the census population from the various settlements in the study area. This is not a complete enumeration of study area population as it does not account for people living outside the settlements. This is especially significant in the earlier census years - in 1941 only 5000 of 11000 people were attributed to specific communities whereas in 1981 only 550 of 25300 were outside specific communities.

SHSP population information has the advantage of being published annually. It does however tend to be higher than census data for similar groups as it is based on addresses and not actual counts. Indian Reserve population figures are typically determined by the number of people in a particular band as opposed to individual residences. In addition, SHSP may combine small and distinct communities together - Kinoosao and Southend for example.

Census data, in addition to being available only at five year intervals, are hampered by an inability to produce meaningful socio-economic data for small centers due to the confidentiality rules.

An additional source of data is the vital statistics of Indian Bands published by Health and Welfare Canada (Table G-6). These data pertain to closed Band populations and provide a good measure of the components of natural increase. They do not however indicate residence of the population - only the numbers living on and off reserves.

4.0 POPULATION CHARACTERISTICS

The study area encompasses a wide range of lifestyles with corresponding social indicators.

The 1981 Census resulted in the creation of a Native Summary Tape which allows for the comparison of data between native and non-native groups (Table G-7). The tape did not provide for a detailed breakdown by community. As a result, information is available for La Ronge and Census Division 18 in its entirety (Census Division 18 encompasses the northern non-agricultural part of the province). It does, however, provide useful information on population structure and economic context. Information for Census Division 18 can be taken as surrogate measures for population groups other than La Ronge.

Some information was also available for Indian Reserves (in addition to La Ronge). This information provides additional details on socio-economic circumstance in these groups.

Some comments on the range of information pertaining to population characteristics are contained below.

4.1 Age Structure

Native populations are typically younger with over half being under 20 (Table G-7). This structure is reflected in larger household and family sizes (Table G-9).

Potential labor force figures can be estimated from age structure information. Calculations of the potential labor force (ages 15 to 64) in the study area from 1971 to 1986 based on SHSP data are presented

(Table G-8). Average annual growth in the potential labor force has been 5.4% over this period.

4.2 Education

Generally, native populations have less education than non-native populations - only 12% have graduated from high school, or have some technical or university training (Table G-7). The native population of La Ronge is the exception having an education profile which is similar to that of the non-native group.

4.3 Employment Levels

Employment levels among those in the labor force are in the 94% to 97% for non-natives and tend to be in the 80% to 90% range for natives (Table G-7).

4.4 Labor Force Participation

The native labor force participation in La Ronge is very high 78% compared to 42% in C.D. 18 (Table G-7). There is not much difference between native and non-native groups in La Ronge for both males and females.

4.5 Income Distribution

Income distributions show significant gaps between natives and non-natives (Table G-7). There is no information on non-native income groups in La Ronge (Tables G-6 to G-9).

5.0 ECONOMIC BASE

La Ronge is the major economic center in northern Saskatchewan. The primary economic base of La Ronge has changed focus from tourism (beginning in 1947 with access provided by the completion of Highway 2), to mining (with a nearby copper mine providing considerable employment from 1965 to 1972) to regional administration (with the headquarters of DNS located in La Ronge) and again to mining (with current activity in the Greenstone Belt at a unprecedented level). La Ronge also serves as a retail/wholesale center for outlying communities and settlements.

There is little difficulty in describing the economic activity base of the study area in general terms, but data measuring the volume of various activities are sparse.

Tourism generates considerable employment in the May to September season in the form of guiding, dock work, filletting and cleaning. Tourism supports the hotels, restaurants, service stations, handicraft outlets and other retail outlets.

Primary industries are also important. Several mining and exploration companies have offices in La Ronge. Exploration and development activity have an impact on all economic sectors.

An overview of the economic structure of La Ronge is provided by data from a survey conducted in 1978 (Table G-10). While the relative importance of the various sectors will have evolved since then, the basic contribution of each sector will have remained intact.

The information indicates that mining exploration and hotel/motels were the largest employers followed by transportation and renewable resource industries. The effects of part-time employment by the outfitters is significant. The construction sector is expected to be significantly downsized under current conditions.

6.0 TRANSPORTATION

The primary transportation artery is Highway 102, which runs from La Ronge to Southend. Highway 905 runs north from a junction near Southend up to the Wollaston Lake district. Highway 102 is paved from La Ronge to Wadin Bay but is a winding gravel surfaced route from that point. Highway 102 is used to transport goods to and from the Rabbit Lake Mine-Mill near Wollaston Lake, as well as to transport people and goods to and from the communities, settlements, and industrial developments in the area. It is also used by tourists who come into the area to camp, fish, canoe, etc.

La Ronge is linked to southern Saskatchewan and the provincial highway network by Highway 2, which is a high standard two lane paved highway. Data pertaining to traffic flows in the various control sections in the study area for 1983 and 1984 indicate that traffic volumes decrease significantly as one goes north (Table G-11).

The La Ronge airport has a 1525 m by 46 m hard surface landing surface, with lights, at a 379 m elevation. The airport is used for scheduled and chartered flights. Available information indicates that approximately 40% of aircraft movements are local. Of the itinerant movements the majority are with piston-type power plants and are domestic commercial flights other than carriers (Table G-12).

There are charter air services from La Ronge, Missinipe and Southend. Charter taxi services in La Ronge and Stanley Mission provide services to that part of the population without private vehicles. Regular bus service between Prince Albert and La Ronge is available on Monday through Saturday.

Thus, the study area is linked to areas outside the region by highway and air. Internally, Highway 102 represents the major artery for the flow of people and goods between communities and other outlying sites. Air charter represent an important method of access to sites away from the highway. Land access to specific resource sites is afforded by winter trails and a few permanent roads.

7.0 LAND USE

The land use pattern in the study area reflects the economic base of the area and the transportation system which is in place. Generally, the traditional renewable resource-based activities have been complemented by tourist-based uses and other resource-based activities such as mining, forestry, wild rice production, etc.

Information on trapping and commercial fishing is found in Sections E and F respectively.

7.1 Forestry

The Churchill River represents the northern most extent of the commercial forest in the study area. Forests north of the Churchill are considered non-commercial due to the smaller size of the timber and the lack of access. Weyerhauser (formerly the Prince Albert Pulp Co.) have the license covering that portion of the study area south of the Churchill, excluding Lac La Ronge Provincial Park. The degree of forestry activity in the study area is limited to the southern and western fringes. Weyerhauser submits an annual cutting plan to the Timber Management Section, Forestry Branch, Saskatchewan Department of Parks and Renewable Resources.

7.2 Mineral Exploration/Extraction

The process of developing the mineral resources potential of the study area follows a natural development scheme involving claim staking, cut lines, geophysical examination, samples, drilling programs, estimation of reserves and finally, mine development. This process is ongoing with current levels of activity in the Greenstone Belt emphasizing gold resources.

The La Ronge region has experienced mineral exploration since the 1920's. There have been four mining operations in the last 45 years: 1940-42, Preview Mines Ltd. at Preview Lake; 1965-68, Rottenstone Lake Operation (intermittent during winter); 1966-72, Anglo-Rouyn copper mine on Lac La Ronge; 1968-73, Decade Mine at Mallard Lake (intermittent during summer).

Current exploration and development areas are concentrated in several areas, those being the general areas around Sulfide Lake, Star Lake, Waddy Lake and Laonil Lake. These areas are seeing combinations of intense exploration, pre-feasibility and development work. The most significant mineral deposits are presented on Map D and outlined below. The Star deposit has resulted in the producing mine/mill complex near Star Lake.

Significant Mineral Deposits

1. Silfide Lake Area

Deposit: Studer A
Owner: SMDC-Benz-Denison
Reserves: 160,000 tons grading 0.22 oz. Au/ton

2. Star Lake Area

Deposit: Tamar
Owner: Claude Resources
Reserves: Z10 tuf grading 0.2102 oz. Au/ton

Deposit: Tower Lake East
Owner: SMDC, Golden Rule, Goldsil, Comaplex
Reserves: 400,000 tons grading 0.12 oz. Au/ton

Deposit: Jolu
Owner: Mahogany Minerals, Canadian Premium Resources and Royex Gold Mining Corporation
Reserves: 175,000 tons grading 0.63 oz. Au/ton

Deposit: Jojay
Owner: Claude Resources
Reserves: 310,000 tons grading 0.25 oz. Au/ton

Deposit: Star
Owner: SMDC, Starrex and Uranerz
Reserves: 230,000 tons grading 0.17 oz. Au/ton

3. Waddy Lake Area

Deposit: Wedge
Owner: Giant Yellowknife, Golden Rule and SMDC
Reserves: 6,000,000 tons grading 0.17 oz. Au/ton

Deposit: Weedy 13
Owner: Golden Rule and SMDC
Reserves: 900,000 tons grading 0.12 oz. Au/ton

Deposit: Twin (North and South)
Owner: Giant Yellowknife, Golden Rule and SMDC
Reserves: 600,000 tons grading 0.15 oz. Au/ton

Deposit: Komis
Owner: Placer development and Waddy Lake
Reserves: 1,600,000 tons grading 0.15 oz. Au/ton

Deposit: Partridge
Owner: Placer Development and Waddy Lake
Reserves: 180,000 tons grading 0.18 oz. Au/ton

4. Laonil Lake Area
Deposit: Seabee
Owner: Claude Resources and Placer Development
Reserves: 1,120,000 tons grading 0.52 oz. Au/ton

Information pertaining to localized activity in the study area can be obtained from the Saskatchewan Precambrian Geological Laboratory in La Ronge.

7.3 Designated Lands

Designated areas consist of lands set aside for a specific community, public, or range of uses. In Saskatchewan, there are 20 major types of designated lands - 4 of these are found in the study area.

Under the general category of preservation and protection areas which total over 400 in the province, 3 occur in the study area. These are identified on Map D.

Protected Areas
Name: Hickson-Maribelli Lake
Order-in-Council Number: Bill 66/77
Date Established: 1970
Location: 56 6' N 104 27' W
Area: 181 acres
Purpose of Designation: Archeological Site

Provincial Historic Sites

Name: Peter Pond's Post
Date Established: before 1965
Location: 55 38' N 104 44' W
Name: Stanley Mission
Date Established: before 1960
Location: 55 25' N 104 33' W

There are no teaching and research areas in the study area. There is one provincial park, Lac La Ronge Provincial Park, which was created in 1939. In addition, the study area falls within the Northern Provincial Forest which is the largest of nine provincial forests in the province.

In addition, there are three areas designated by the International Biological Program (IBP) within the study area. These IBP areas, which are noted on Map D, include an area at Black Bear Island Lake with 6 pictograph sites, and area at Deep Bay (Reindeer Lake) which is believed to be of meteoric origin, and an area at Frog Portage (Churchill River) which is of historic and archaeological interset. The IBP areas at Black Bear Island Lake and Frog Portage overlap with provincially designated natural areas, somewhat larger in area.

7.4 Campgrounds

There are 15 campgrounds offering 340 campsites in the study area (Table G-13). Twenty-eight of the sites have electricity. Six of the campgrounds are within the Lac La Ronge Provincial Park. Three campgrounds are private operations accounting for 11 electric and 3 non-electric campsites. The remaining campgrounds are operated by the province.

Seven campgrounds accounting for 257 sites are found within 30 km of La Ronge. The campgrounds in the periphery are generally smaller in size.

7.5 Tourist Outfitting

There are known to be 45 tourist outfitting operations active in the study area (Table G-14). Practically all these operations (42 of 45) are fishing outfitters but only 23 are only fishing outfitters. Many combine fishing and big game outfitting while a few are involved with canoe outfitting (Table G-16). There are 13 involved in big game pursuits and one in game bird pursuits. There are nine canoe outfitters but only two are just canoe outfitters. There is one operation offering raft tours.

The vast majority of operations have fly-in access (37 of 45) of which only 4 also have road access (Table G-15). Sixteen are accessible by boat and 12 have road access. The range of services offered by the outfitters varies but most have package plans, guide service, and bedding. Some have dining facilities, offer credit card services and conference facilities.

7.6 Documented Canoe Routes

Of the 55 documented canoe routes in Saskatchewan, 32 intersect with the study area. The majority of these routes center on the Churchill River system. These routes range from 1 to 2 days and 3 portages, up to 10 to 14 day journeys with up to 25 portages. Some of these routes are only partially in the study area (Table G-20; Map D).

These routes involve a total of 58 lakes in the study area. These lakes have been identified and put into directories having alternately alphabetic, north-south, and east-west listings (Tables G-17 to G-19).

7.7 Other Land Uses

Other types of land use which may be significant in some circumstances include recreational surface leases, wild rice leases and land claim areas. Recreational surface leases are given to individuals for private recreational use. Wild rice leases give their holders rights to harvest wild rice. Land claim areas are areas which have been claimed to settle outstanding land entitlements with Indian Bands.

Detailed locations of these land uses in local areas can be obtained from Saskatchewan Parks and Renewable Resources or the Indian and Native Affairs Secretariat (see Section 9.0).

The locations and extent of crown land band selections of the Peter Ballantyne Band, which fall into the study area, are depicted on Map D. There are 13 selections in the study area.

The La Ronge Band, while not having a similar set of crown land selections, currently has a general claim before the federal court. There are no particular pieces of land identified in this claim. At this time, the band and the provincial government are negotiating the exchange of several small parcels of land.

8.0 BIBLIOGRAPHY

Health and Welfare Canada. 1978, 1979, 1980, 1981, 1982, 1983. "Vital Statistics for the Registered Indian Population of Saskatchewan".

Independent Mineral Developers Association. 1985. "The Prospect". Vol. 1.

Indian and Northern Affairs Canada. 1985. "Potential Resource Projects in Saskatchewan, 1985", Map with Table.

Saskatchewan Energy and Mines. "Gold in Saskatchewan".

Saskatchewan Highways and Transportation. 1984. "Travel on Saskatchewan Highways 1984".

Saskatchewan Mining Development Corporation. 1985. "Star Lake Project Environmental Impact Statement".

Saskatchewan Tourism and Small Business. 1986. "Saskatchewan Outdoor Adventure".

Saskatchewan Tourism and Small Business. 1986. "Saskatchewan Accommodation".

Schindelka, C. Roger. 1979. "Business and Employment in the La Ronge district of Northern Saskatchewan 1978". Institute for Northern Studies.

Signe Research Associates Ltd. 1986. "Demographic Data - Northern Saskatchewan". Prepared for: Northern Affairs Secretariat, Saskatchewan.

Statistics Canada. "1981 Canada Census".

Transport Canada. 1980. "Aircraft Movement Statistics".

9.0 DATA SOURCES AND CONTACTS

The following data sources and points of contact represent the primary avenues for updating data and refining localized circumstances.

Northern Affairs Secretariat
Deputy Minister
787-2909

Chief Executive Officer
Employment Development Agency
787-9636

Department of Energy and Mines
Executive Director
Geology and Mines Division
787-2560
La Ronge Field Office
425-4498

Department of Tourism and Small Business
Manager, La Ronge Resource Center
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Department of Urban Affairs
Northern Municipal Services Branch
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Saskatchewan Parks and Renewable Resources
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953-2222
Director, Resource Lands Branch
787-2852
Director, Parks Branch
787-2846

Indian and Northern Affairs Secretariat
Secretary
787-6250
Assistant Secretary, Economic Development
787-9586
Assistant Secretary, Lands and Constitutional Affairs
787-6252

Department of Highways and Transport
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Table G-1 Study Area Population Distribution

Name	Components	Estimates	
LA RONGE	Town of La Ronge	2700	
	Northern Village of Air ronge	550	
	La Ronge Band Reserves #156 Lac La Ronge #156A Potatoe River, #156B Kitsakie	1000	
			4250
SUCKER RIVER	Sucker River Reserve #156C		45
Stanley Mission	Northern Hamlet of Stanley Mission	210	
	Stanley Reserve #157	665	
			875
GRANDMOTHER'S BAY	Grandmother's Bay Reserve #219		130
MISSINIPE	Northern Hamlet of Missinipe		100
BRABANT LAKE	Northern Settlement of Brabant Lake		150
SOUTHEND	Northern Hamlet of Southend	310	
	Southend Reserve #200	290	
			600
TOTAL ESTIMATED STUDY AREA POPULATION			6150

SOURCE: population figures are adapted from "Star Lake Project Environmental Impact Statement", SMDC, 1985

Table G-2 Indian Reserve Community Infrastructure
(Information current as of March 15, 1985)

X = Yes XXX = Predominate

	Lac La Ronge 156	Sucker River 156C	Grand-mother's Bay 219	Stanley Mission 157	South-end 200
PUBLIC SERVICES					
School	X	X	X	X	X
Health Clinic	X		X		X
Band Office	X			X	X
Fire Hall				X	
ACCESS					
By Road	XXX	XXX	X	XXX	XXX
Air Strip	X		X	X	
UTILITIES					
- WATER					
Community Supply		X			
Individual Systems		XXX	XXX		XXX
Trucked Distribution	XXX			XXX	X
- SEWER					
Pit Toilets	XXX	XXX	XXX	XXX	XXX
Individual Systems	X				X
- POWER	X	X	X	X	X
- TELEPHONE	X	X		X	X
- DISPOSAL GROUND W/PIT	X			X	X
COMMERCE/INDUSTRY					
General Store					X
Gas Station					X
Industry	X				
Other Businesses	X				
RECREATION					
Community Hall	X	X	X	X	X
Skating Rink	X				X
Sports Ground	X			X	X
Playground	X	X	X	X	X
Recreation Centre	X			X	
Arena					X

SOURCE: "Potential Resource Projects in Saskatchewan 1985"
Indian and Northern Affairs Canada

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Table G-3 Community Infrastructure and Services

	I.R. 156	AIR RONGE	LA RONGE	WADIN BAY	SUCKER RIVER	I.R. 157	STANLEY MISSION	G'MOTHER'S BAY	MISSINIPE	BRABANT LAKE	I.R. 200	SOUTHEND
INFRASTRUCTURE												
Highway	X	X	X	X	X	X	X		X	X		X
Bus, Taxi	X	X	X			X	X		X	X		X
Airstrip	X	X	X			X	X		X			
Water System	X	X	X	X			X		X	X		X
Sewer/ Septic	X	X	X	X		X	X		X	X		X
Garbage Collection	X	X	X	X	X	X	X		X	X		X
Elementary School	X	X	X		X		X	X		X	X	X
Secondary School	X	X	X				X					
Community College	X	X	X									
Alternate School	X	X	X									
Learning Center										X		X
Fire Protection	X	X	X				X		X			
Communications	X	X	X	X	X	X	X		X	X	X	X
Radio	X	X	X			X		X	X	X		
Satell/Cable TV	X	X	X	X			X	X	X	X		X
Radio Telephone					X			X				
Print Media	X	X	X									
SERVICES												
Hospital		X	X									
Medical Clinic	X	X	X									
Dental Clinc	X	X	X									
Nursing Station						X	X					
Regular Medical Visits					X	X	X	X	X	X		X
Road Ambulance Service	X	X	X	X	X	X	X		X	X		X
Air Ambulance Service	X	X	X	X	X	X	X	X	X	X		X
Social Services	X	X	X							X		X
Daycare	X	X	X			X						
Cultural Facilities	X	X	X			X						
Recreational Facilities	X	X	X	X		X	X	X	X	X	X	X
Service Clubs	X	X	X									
Alcoholics Anonymous	X	X	X									X
Youth Centre	X	X	X									

SOURCE: "Star Lake Project Environmental Impact Statement", SMDC, 1985

Table G-4 Study Area Settlement Population, 1941 - 1981
(Based on data from Canadian Censuses)

Settlement ***	1941	1951	1961	1966	1971	1976	1981
Air Ronge (PL)					239	348	557
Anglo Rouyn Mine Site					214		
Brabant Lake (PL)					5	26	245
Grandmother's Bay (R.219)							99
Kinoosao (PL)					95	*	82
Lac La Ronge (R.156)						242	342
La Ronge (T)	216	416	707	933	906	1714	2579
McIntosh Lake			88				
Missinipe (PL)					22	125	50
Southend (PL) **		50		114	140	225	318
Stanley (R.157)							539
Stanley Mission (PL)	48	84	44	120	951	157	140
Sucker River (R.156c)				92	107	85	91
Totals	264	550	839	1259	2679	2922	5042

PL - Place (1981 Census of Canada)
T -Town (1981 Census of Canada)
R. -Reserve (1981 Census of Canada)

* -Not shown separately
** -Data shown as Southend (R.200) in 1981 Census of Canada
***-Settlement status as of 1981

SOURCE: "Demographic Data - Northern Saskatchewan"
Signe Research Associates Ltd. 1986

Table G-5 Study Area Community Population counts, 1971 - 1986
(Based on data from Saskatchewan Hospital Services Plan)

Settlement	1971	1972	1973	1974	1975	1976	1977	1978
Air Ronge	355	402	434	428	375	318	295	363
Anglo Rouyn Mine	282	272						
La Ronge (R.156)	2141	2203	2274	2343	2410	2442	2428	2563
La Ronge	1221	1253	1259	1395	1708	1984	2140	2113
Southend *	304	308	327	340	330	380	384	424
Stanley Mission	166	173	178	161	175	171	176	288
Totals	4469	4611	4472	4667	4998	5295	5423	5751

Settlement	1979	1980	1981	1982	1983	1984	1985	1986
Air Ronge	407	519	490	556	532	539	534	472
Anglo Rouyn Mine								
La Ronge (R.156)	2568	2655	2721	2799	2816	2930	2995	3061
La Ronge	2378	2644	2890	2905	2844	2708	2786	3013
Southend *	291	286	285	317	315	300	306	311
Stanley Mission	313	208	220	211	208	212	211	225
Totals	5957	6312	6606	6788	6715	6689	6832	7082

* -Includes Wollaston Lake for 1971-1978 and Kinoosao 1971-1986

SOURCE: "Demographic Data - Northern Saskatchewan"
Signe Research Associates Ltd. 1986

Table G-6 Lac La Ronge Indian Band Population Counts, 1978-1983

	As of previous Dec. 31				
Year	Off Reserve	On Crown Land	On Reserve	Natural Increase During Year	Dec. Total plus 1/2 Natural Increase
1978	331	115	2181	92	2673
1979	343	116	2254	64	2745
1980	350	116	2318	74	2821
1981	357	102	2364	76	2861
1982	373	103	2400	86	2919
1983	388	110	2476	71	3010

SOURCE: "Vital Statistics for the Registered Indian Population of Saskatchewan", Health and Welfare Canada, 1978, 1979, 1980, 1981 1982, 1983.

Table G-7 Native and Non-Native Population Characteristics

	La Ronge				C.D. 18			
	Non-Native		Native		Non-Native		Native	
	#	%	#	%	#	%	#	%
AGE STRUCTURE								
under 5	210	12%	130	17%	945	11%	2530	15%
5-19	465	26%	245	32%	2320	27%	7105	43%
20-34	675	38%	285	37%	2945	34%	3640	22%
35-64	400	22%	105	14%	2135	25%	2705	16%
65+	50	3%	-	0%	280	3%	630	4%
	1800		765		8625		16610	
EDUCATION (Population 15 to 64)								
None/Kind.	35	3%	10	2%	55	1%	1455	16%
Grade 1-4	10	1%	10	2%	50	1%	920	10%
Grade 5-8	115	9%	80	19%	775	13%	3390	37%
Grade 9-13	365	28%	110	26%	2045	33%	2205	24%
H.S. Grad	95	7%	20	5%	480	8%	135	1%
Technical	320	24%	115	27%	1460	24%	715	8%
Some Univ.	175	13%	55	13%	480	8%	205	2%
Univ. Grad	200	15%	30	7%	795	13%	120	1%
	1315		430		6140		9145	
EMPLOYMENT LEVELS								
Employed	1030	96%	315	90%	4400	96%	3195	84%
Unemployed	40	4%	35	10%	200	4%	625	16%
-Males								
Employed	620	96%	120	80%	2755	97%	2095	83%
Unemployed	20	4%	35	20%	90	3%	430	17%
-Females								
Employed	410	95%	195	97%	1645	94%	1105	85%
Unemployed	25	5%	5	3%	110	6%	190	15%
LABOUR FORCE PARTICIPATION								
Labour Force	1075	83%	350	78%	4600	75%	3815	42%
Non-force	225	17%	100	22%	1525	25%	5325	58%
-Males								
Labour Force	645	88%	150	88%	2850	86%	2525	54%
Non-force	75	12%	20	12%	470	14%	3170	46%
-Females								
Labour Force	430	74%	200	73%	1755	62%	1295	30%
Non-force	150	26%	75	27%	1060	38%	3170	70%
INCOME DISTRIBUTION (Population 15 to 64)								
under 5,000	-	-	145	35%	1265	23%	3070	48%
5000-9999	-	-	120	29%	900	16%	1695	27%
10000-14999	-	-	70	17%	780	14%	795	13%
15000-19999	-	-	20	5%	765	14%	415	7%
20000+	-	-	60	14%	1745	32%	375	6%
			415		5455		6350	

SOURCE: Census Canada Native Summary Tape as presented in "Demographic Data-Northern Saskatchewan", Signe Research Assoc. Ltd., 1986

Table G-8 Study Area Potenital Labour Force, 1971, 1976, 1981 and 1986
(Based on data from Saskatchewan Hospital Services Plan)

	1971		1976		1981		1986	
Settlement	No.	%	No.	%	No.	%	No.	%
Air Ronge	203	57%	173	54%	312	64%	293	62%
Anglo Rouyn Mine	183	65%						
La Ronge (R.156)	1011	47%	1178	48%	1360	50%	1659	54%
La Ronge	694	57%	1215	61%	1892	65%	1938	64%
Southend *	147	48%	189	50%	152	53%	173	56%
Stanley Mission	82	49%	83	49%	111	50%	123	55%
Totals	2320		2838		3827		4186	

* -Includes Wollaston Lake for 1971,1976 and Kinoosao 1971-1986

SOURCE: "Demographic Data -Northern Saskatchewan"
Signe Research Associates Ltd. 1986

Table G-9 Selected Census Subdivision Characteristics
(1981 Canada Census)

Numbers are randomly rounded to 5 or 0

	Occupied Private Dwellings		
	Total	Owned	Rented
Grandmothers Bay R.219	25	20	-
Kitsakie R.156B	95	95	-
La Ronge (T)	805	275	535
Lac La Ronge R.156	60	40	20
Southend R.200	55	45	15
Stanley R.157	95	90	5
Sucker River R.156C	20	20	-

	Marital Status			
	Single Adults	Married	Widowed	Divorced
Grandmothers Bay R.219	15	35	5	-
Kitsakie R.156B	115	175	20	5
La Ronge (T)	495	1180	30	45
Lac La Ronge R.156	60	115	-	-
Southend R.200	35	110	-	-
Stanley R.157	105	180	5	-
Sucker River R.156C	20	35	-	-

	Average persons per Private Household	Average persons per Family	Average Children per Family
Grandmothers Bay R.219	4.5	5.1	3.1
Kitsakie R.156B	5.6	4.4	2.7
La Ronge (T)	3.2	3.4	1.6
Lac La Ronge R.156	5.6	4.6	2.8
Southend R.200	5.7	4.8	2.9
Stanley R.157	5.7	4.8	2.9
Sucker River R.156C	4.7	4.3	2.5

Table G-10 Classification of Businesses Active in the La Ronge Area, by Industrial Sector, By Employment, as of June 30, 1978

Business Category	Number of Businesses	Total Employed		Average Employed	
		Full-time	Part-time	Full-time	Part-time
Renewable Resource Industries	4	52	2	13.0	0.5
Mining Exploration	15	108	3	36.0	0.2
Construction	24	142	2	5.9	0.1
Transportation	11	119	23	10.8	2.1
Retail/ Wholesale	24	108	19	4.5	0.8
Services	24	101	27	4.2	1.1
Motels/Hotels	4	89	19	22.3	4.8
Outfitters	26	110	122	4.2	4.7
TOTAL	132	829	217	6.3	1.6

SOURCE: "Business and Employment in the La Ronge District of Northern Saskatchewan 1978", C. Roger Schindelka, Institute for Northern Studies, 1979.

Table G-11 Highway Traffic Flows, 1983, 1984

Control Section	Description	Length km	1984 ADT *	1984 Annual Travel Vehicle Km (000,000)	1983 ADT *	1983 Annual Travel Vehicle Km (000,000)
2-24	Jct 165 - La Ronge	31.46	495	5.68	495	5.68
102-25	La Ronge - Nemeiben R. Bridge	30.30	425	4.70	420	4.64
102-26	Nemeiben R. Bridge - Churchill River	54.30	240	4.76	240	4.76
102-27	Churchill River - Island Lake	51.98	110	2.09	105	1.99
102-28	Island Lake - Waddy River	36.44	75	1.00	76	1.00
102-29	Waddy River - Reindeer Lake	43.40	65	1.03	50	0.95

* - Average Daily Traffic

SOURCE: "Travel on Saskatchewan Highways 1984",
Saskatchewan Highways and Transportation

Table G-12 Aircraft Movements, La Ronge Airport, 1976-1980

	Year				
	1976	1977	1978	1979	1980
Total, All Movements	1940	22459	17447	19066	27775
Total, Local Movements	920	10946	5452	6423	11221
Total, Itinerant Movements	1020	11513	11995	12643	16554
- by type of power plant					
-jet	66	50	38	56	-
-turbo	270	2964	2803	3160	3763
-piston	731	8368	8992	9183	12137
-helicopter	18	122	159	250	587
-glider	1	3	3	-	1
- by class and type of operation					
- domestic					
-carriers	299	3194	2956	2525	2402
-other commercial	463	4175	5718	5987	8962
-private	133	2836	2037	2613	2265
- international					
-carriers	7	17	7	2	1
-other commercial	4	31	12	37	35
-private	2	208	215	212	178
- government					
-civil	108	994	1029	1203	2687
-military	4	58	21	64	24

SOURCE: "Aircraft Movement Statistics" Transport Canada, 1980

Table G-13 Study Area Campgrounds

Name	Location	Season	Campsites	Fees	Services
Lindy's Camper Park	La Ronge	May 1-Sept30	8 Elec	$10.50 Elec/Wtr	P,I,C,B,
Nut Point Campground *	1 km N of La Ronge	May 15-Sept 1	17 Elec 103 N/Elec	$6 N/Elec $7 Elec	T,P,F,O
XYD Fishing Camp Campground	16 km N of La Ronge	Year Round	3 N/Elec	Upon Req.	G,B
English Bay Campground *	18 km N of La Ronge	May 15-Sept 1	14 N/Elec	$6 N/Elec	P,F,O
Nemeiben Lake Campground *	18 km N of La Ronge	May 15-Sept 1	52 N/Elec	$6 N/Elec	T,P,F,O
Wadin Bay Campground *	27 km N of La Ronge	May 15-Sept 1	57 N/Elec	$6 N/Elec	T,P,F,O
Cooper's Wadin Bay Outfitters Campground	27 km N of La Ronge	May 20-Oct 15	3 Elec	$15 Day	T,P,F,I,G
MacKay Lake Campground	61 km N of La Ronge	May 1-Nov 15	6 N/Elec	$6 N/Elec	P,F,O
Missinipe Campground *	Km 80 on Hwy 102	May 15-Sept 1	15 N/Elec	$6 N/Elec	P,F,O
Churchill River Campground *	Km 86 on Hwy 102	May 1-Nov 15	13 N/Elec	$4 N/Elec	P,F,O
Devil's Lake Campground	Km 93 on Hwy 102	May 1-Nov 15	4 N/Elec	$6 N/Elec	P,F,O
Dickens Lake Campground	Km 99 on Hwy 102	May 1-Nov 15	2 N/Elec	$6 N/Elec	P,F,O
McLennan Lake Campground	Km 133 on Hwy 102	May 1-Nov 15	9 N/Elec	$6 N/Elec	P,F,O
Southend Reindeer Lake Campground	20 km E jct Hwy 102/905	May 1-Nov 15	19 N/Elec	No Fee	T,P,F,O
Davin Lake Campground	70km N jct Hwy 102/905	May 1-Nov 15	15 N/Elec	No Fee	P,F,O

KEY: P = Picnicking, I = Ice, C = Canoe Rental, B = Boat Rental
T = Telephone, F = Firewood, O = Outdoor Toilets, G = Groceries

SOURCE: "Saskatchewan Accommodation", Tourism Saskatchewan, 1986

Table G-14 Study Area Outfitters, by Name, Location and Type

		Type			
Location	Name	Fishing	Big Game	Game Bird	Canoe
1 Bigstone Lake	Evergreen Fishing Lodge	Yes			
2 Black Bear Is. Lake	B.B.I.L. Fly-in Lodge	Yes	Yes		
3 Black Bear Is. Lake	Hilliards Pine Island Camp	Yes	Yes		
4 Campbell Lake	Skeezix Camps Ltd	Yes	Yes		
5 Churchill River	Mukwch Raft Tours				
6 Churchill River Area	Can. Wilderness Advent. Ltd				Yes
7 Mountain Portage	Beyond La Ronge Lodge	Yes	Yes		
8 Nistowiak Lake	Jim's Camp	Yes			
9 Potter Rapids	Churchill R. Leisure Lodge				Yes
10 Potter Rapids	Drinking Falls Lodge	Yes			
11 Copp Lake	Twin Lakes Fly-In	Yes	Yes		Yes
12 Deception Lake	Deception Lake Lodge	Yes			
13 Eulas Lake	Foster River Camps	Yes	Yes		Yes
14 Glennie Lake	Glennie Lake Fly-In	Yes			Yes
15 Hepburn Lake	Hepburn Lake Lodge	Yes			
16 Kenwood Lake	Twin Lakes Fly-In	Yes			Yes
17 Kenyon Lake	Kenyon Lake Fly-In	Yes			
18 Lac La Ronge	B & L Cabins and Outfitt. Ltd.	Yes			
19 Lac La Ronge	C.W.A Houseboat Charters	Yes			
20 Lac La Ronge	Camp Kinisoo (1976) Ltd.				
21 Lac La Ronge	Cooper's Wadin Bay Outfitt.	Yes		Yes	Yes
22 Lac La Ronge	Cornhusker Fishing Camp	Yes			
23 Lac La Ronge	Dalyn Fishing Camp	Yes	Yes		
24 Lac La Ronge	Hunters Narrows Camp	Yes	Yes		
25 Lac La Ronge	Keighleys Camps	Yes	Yes		
26 Lac La Ronge	North Country Fishing Camps	Yes			
27 Lac La Ronge	Rapid River Lodge	Yes			
28 Lac La Ronge	Red's Camp	Yes			
29 Lac La Ronge	Trail North Fishing Camp	Yes			
30 Lac La Ronge	XYD Fishing Camp	Yes			
31 Macoun Lake	Fantasy Island Lodge	Yes			
32 McIntosh Lake	Sportsman's Lodge	Yes			
33 McLennan Lake	Tamarack Lodge	Yes			Yes
34 Nagle Lake	Nagle Lake Lodge	Yes	Yes		
35 Nemeiben Lake	Lindwood Lodge	Yes			
36 Nemeiben Lake	Sunset Island International	Yes			
37 Otter Lake	Churchill R. Canoe Outfitters	Yes			Yes
38 Paull Lake	Paull River Wilderness Camp	Yes	Yes		
39 Pointer Lake	Pointer Lake Fishing Camp	Yes			
40 Reindeer Lake	Nordic Lodge	Yes			
41 Reindeer Lake	Reindeer Lake Trout Camp	Yes	Yes		
42 Settee Lake	Josdal Camps	Yes			
43 Shadd Lake	Shadd Lake Cabins	Yes	Yes		
44 Sulphide Lake	Medora Fishing Camp	Yes			
45 Trout Lake	Boreal Camp/Services Outfitt.	Yes		Yes	

SOURCE: "Saskatchewan Outdoor Adventure", Saskatchewan Tourism and Small Business, 1986.

Table G-15 Study Area Outfitters, by Location, Type of Access

	Location	Position				Access		
						Fly-In	Drive-In	Boat In
1	Bigstone Lake	55	4	105	24	Yes		
2	Black Bear Is. Lake	55	38	105	40	Yes		
3	Black Bear Is. Lake	55	38	105	40	Yes		
4	Campbell Lake	55	46	105	30	Yes		Yes
5	Churchill River	55	24	104	33	Yes		
6	Churchill River Area	55	24	104	33		Yes	
7	Mountain Portage	55	29	104	30	Yes		Yes
8	Nistowiak Lake	55	25	104	20	Yes		Yes
9	Potter Rapids	55	24	104	17	Yes		Yes
10	Potter Rapids	55	24	104	17	Yes		
11	Copp Lake	56	25	104	1	Yes		
12	Deception Lake	56	33	104	14	Yes		
13	Eulas Lake	55	54	105	38	Yes		Yes
14	Glennie Lake	55	54	103	54	Yes		
15	Hepburn Lake	55	50	104	39	Yes		
16	Kenwood Lake	56	17	104	8	Yes		
17	Kenyon Lake	56	18	104	55	Yes		
18	Lac La Ronge	55	10	105	0		Yes	
19	Lac La Ronge	55	10	105	0	Yes		Yes
20	Lac La Ronge	55	10	105	0	Yes	Yes	
21	Lac La Ronge	55	10	105	0	Yes	Yes	
22	Lac La Ronge	55	10	105	0	Yes		Yes
23	Lac La Ronge	55	10	105	0	Yes		Yes
24	Lac La Ronge	55	10	105	0	Yes		Yes
25	Lac La Ronge	55	10	105	0	Yes		Yes
26	Lac La Ronge	55	10	105	0	Yes		Yes
27	Lac La Ronge	55	10	105	0	Yes		Yes
28	Lac La Ronge	55	10	105	0		Yes	
29	Lac La Ronge	55	10	105	0	Yes		Yes
30	Lac La Ronge	55	10	105	0		Yes	
31	Macoun Lake	56	32	103	50	Yes		
32	McIntosh Lake	55	45	105	8	Yes		
33	McLennan Lake	55	54	104	20		Yes	
34	Nagle Lake	56	6	105	20	Yes		
35	Nemeiben Lake	55	20	105	20	Yes	Yes	
36	Nemeiben Lake	55	20	105	20		Yes	Yes
37	Otter Lake	55	35	104	39		Yes	
38	Paull Lake	56	8	104	50	Yes		
39	Pointer Lake	55	38	103	45	Yes		
40	Reindeer Lake	56	30	103	0		Yes	
41	Reindeer Lake	56	30	103	0	Yes	Yes	Yes
42	Settee Lake	55	43	106	6	Yes		
43	Shadd Lake	55	41	105	26	Yes		
44	Sulphide Lake	55	22	104	54	Yes		Yes
45	Trout Lake	55	37	105	16	Yes		

SOURCE: "Saskatchewan Outdoor Adventure", Saskatchewan Tourism, 1986
SOURCE: "Saskatchewan Outdoor Adventure", Saskatchewan Tourism

Table G-16 Services Provided by Study Area Outfitters

Location	Tele phone	Credit Card	Dining		Pkge Plans	Guide Servi	Bed-ding	Store	Confer-ence Facil.	Boat Launch
			Lic.	Other						
1 Bigstone Lake							Yes			
2 Black Bear Is. L	Yes			Yes	Yes	Yes	Yes	Yes	Yes	
3 Black Bear Is. L	Yes				Yes	Yes	Yes	Yes		
4 Campbell Lake			Yes	Yes	Yes	Yes	Yes	Yes		
5 Churchill River		Yes				Yes				
6 Churchill River		Yes			yes	Yes	Yes			
7 Mountain Portage	Yes			Yes	Yes	Yes	Yes	Yes	Yes	
8 Nistowiak Lake					Yes	Yes	Yes	Yes	Yes	
9 Potter Rapids	Yes			Yes	Yes		Yes	Yes		Yes
10 Potter Rapids	Yes			Yes	Yes	Yes	Yes	Yes	Yes	
11 Copp Lake	Yes				Yes	Yes	Yes			
12 Deception Lake	Yes				Yes					
13 Eulas Lake					Yes	Yes	Yes			Yes
14 Glennie Lake	Yes				Yes	Yes				
15 Hepburn Lake	Yes				Yes		Yes			Yes
16 Kenwood Lake	Yes				Yes	Yes	Yes			
17 Kenyon Lake					Yes	Yes	Yes			
18 Lac La Ronge	Yes					Yes	Yes	Yes	Yes	Yes
19 Lac La Ronge	Yes	Yes			Yes	Yes	Yes	Yes		
20 Lac La Ronge	Yes				Yes					
21 Lac La Ronge	Yes				Yes	Yes	Yes	Yes		Yes
22 Lac La Ronge				Yes	Yes	Yes	Yes			
23 Lac La Ronge	Yes				Yes	Yes		Yes	Yes	
24 Lac La Ronge	Yes			Yes	Yes	Yes	Yes	Yes	Yes	
25 Lac La Ronge					Yes	Yes	Yes			
26 Lac La Ronge						Yes	Yes	Yes		
27 Lac La Ronge	Yes			Yes	Yes	Yes	Yes	Yes	Yes	
28 Lac La Ronge	Yes	Yes				Yes	Yes	Yes	Yes	Yes
29 Lac La Ronge										
30 Lac La Ronge					Yes	Yes	Yes	Yes		Yes
31 Macoun Lake	Yes					Yes				
32 McIntosh Lake			Yes		Yes	Yes	Yes	Yes	Yes	
33 McLennan Lake	Yes									
34 Nagle Lake	Yes					Yes				Yes
35 Nemeiben Lake							Yes	Yes		
36 Nemeiben Lake	Yes			Yes	Yes	Yes				Yes
37 Otter Lake					Yes	Yes	Yes		Yes	Yes
38 Paull Lake	Yes				Yes	Yes	Yes			
39 Pointer Lake					Yes					
40 Reindeer Lake	Yes	Yes			Yes	Yes	Yes	Yes		
41 Reindeer Lake	Yes				Yes	Yes	Yes			Yes
42 Settee Lake	Yes									
43 Shadd Lake						Yes		Yes		
44 Sulphide Lake	Yes				Yes					
45 Trout Lake	Yes	Yes						Yes		

SOURCE: "Saskatchewan Outdoor Adventure", Saskatchewan Tourism and Small Business, 1986.

Table G-17 Directory of Lakes on Canoe Routes, Alphabetic Listing

Lake	Canoe Routes	Position			
Bassett Lake	37	55	35	104	59
Besnard Lake	17,18,54	55	25	106	0
Big Whitemouse L.	10	55	15	104	12
Black Bear Island	10,54,57	55	38	105	40
Brabant Lake	27,33,34,35	56	0	103	43
Buss Lake	53	55	53	105	53
Churchill River	7,8,9,10,16,17,29,34,36,37,39,	55	24	104	33
Colin Lake	33	55	49	104	14
Contact Lake	20,21	55	25	104	52
Davis Lake	31,32,33	55	52	104	20
Ducker Lake	30	55	38	104	45
Elephant Lake	53	56	24	103	52
Freda Lake	6,12,21	55	25	104	47
Freestone Lake	21	55	27	104	45
French Lake	30	55	38	104	57
Frog Portage	5	55	24	103	31
Grandmother's Bay	30	55	37	104	40
Hale Lake	2	55	21	104	31
Hebden Lake	21	55	27	104	48
Hunt Lake	4,11	55	24	104	41
Hunter Bay	3,10	55	10	104	30
Iskwatikan Lake	2,3,7,8,9,10,11,12	55	22	104	22
Kakabigish Lake	27,33	55	51	104	0
Kavanagh Lake	37	55	36	105	2
Kemp Lake	27	55	39	104	17
Kuskawao Lake	20	55	27	104	53
Lac La Ronge	2,3,4,6,10,11,12,43	55	10	105	0
Lynx Lake	6,12,20,21	55	21	104	58
MacKay Lake	37	55	27	104	56
MacLean Lake	31	55	55	104	10
Macoun Lake	53	56	32	103	50
McLennan Lake	31,32,33	55	54	104	20
Mountain Lake	4,27,32	55	29	104	30
Nayelles Lake	53	56	20	103	50
Nemeiben Lake	16,17,18	55	20	105	20

Continued.....

Table G-17 Directory of Lakes on Canoe Routes, Alphabetic Listing (continued)

Lake	Canoe Routes	Position			
Nistoassini Lake	53	56	18	103	55
Nistowiak Lake	11,12	55	25	104	20
Nunn Lake	10	55	15	104	20
Otter Lake	2,3,4,5,6,12,16,17,27,29,30,32	55	35	104	39
Paull Lake	36,37	56	8	104	50
Paull River	36,37	55	49	105	7
Rattler Creek	30	55	38	104	33
Redhill Lake	53	56	9	103	45
Reindeer Lake	35,39,51	56	30	103	0
Reindeer River	34,35,39,51	55	36	103	11
Sandfly Lake	54	55	43	106	6
Settee Lake	32,33	55	50	104	4
Steephill River	34,35	55	58	103	8
Stroud Lake	4,11	55	21	104	45
Sulphide Lake	6,12,20,21	55	22	104	54
Thomas Lake	3	55	17	104	28
Trout Lake	16,18	55	37	105	16
Versailles Lake	31,32,33	55	49	104	20
Waddy Lake	53	56	20	103	50
Waddy River	53	56	8	103	45
Wadin Bay	10	55	17	105	5
Wapiskau River	34,35	56	1	103	21
Whitemoose River	10	55	23	104	10

Table G-18 Directory of Lakes on Canoe Routes, North-South Listing

Lake	Canoe Routes	Position			
Macoun Lake	53	56	32	103	50
Reindeer Lake	35,39,51	56	30	103	0
Elephant Lake	53	56	24	103	52
Waddy Lake	53	56	20	103	50
Nayelles Lake	53	56	20	103	50
Nistoassini Lake	53	56	18	103	55
Redhill Lake	53	56	9	103	45
Waddy River	53	56	8	103	45
Paull Lake	36,37	56	8	104	50
Wapiskau River	34,35	56	1	103	21
Brabant Lake	27,33,34,35	56	0	103	43
Steephill River	34,35	55	58	103	8
MacLean Lake	31	55	55	104	10
McLennan Lake	31,32,33	55	54	104	20
Buss Lake	53	55	53	105	53
Davis Lake	31,32,33	55	52	104	20
Kakabigish Lake	27,33	55	51	104	0
Settee Lake	32,33	55	50	104	4
Colin Lake	33	55	49	104	14
Versailles Lake	31,32,33	55	49	104	20
Paull River	36,37	55	49	105	7
Sandfly Lake	54	55	43	106	6
Kemp Lake	27	55	39	104	17
Rattler Creek	30	55	38	104	33
French Lake	30	55	38	104	57
Ducker Lake	30	55	38	104	45
Black Bear Island	10,54,57	55	38	105	40
Trout Lake	16,18	55	37	105	16
Grandmother's Bay	30	55	37	104	40
Kavanagh Lake	37	55	36	105	2
Reindeer River	34,35,39,51	55	36	103	11
Bassett Lake	37	55	35	104	59
Otter Lake	2,3,4,5,6,12,16,17,27,29,30,32	55	35	104	39
Mountain Lake	4,27,32	55	29	104	30
Freestone Lake	21	55	27	104	45

Continued........

Table G-18 Directory of Lakes on Canoe Routes, North-South Listing (continued)

Lake	Canoe Routes	Position			
Kuskawao Lake	20	55	27	104	53
MacKay Lake	37	55	27	104	56
Hebden Lake	21	55	27	104	48
Besnard Lake	17,18,54	55	25	106	0
Contact Lake	20,21	55	25	104	52
Freda Lake	6,12,21	55	25	104	47
Nistowiak Lake	11,12	55	25	104	20
Churchill River	7,8,9,10,16,17,29,34,36,37,39,	55	24	104	33
Hunt Lake	4,11	55	24	104	41
Frog Portage	5	55	24	103	31
Whitemoose River	10	55	23	104	10
Iskwatikan Lake	2,3,7,8,9,10,11,12	55	22	104	22
Sulphide Lake	6,12,20,21	55	22	104	54
Hale Lake	2	55	21	104	31
Stroud Lake	4,11	55	21	104	45
Lynx Lake	6,12,20,21	55	21	104	58
Nemeiben Lake	16,17,18	55	20	105	20
Wadin Bay	10	55	17	105	5
Thomas Lake	3	55	17	104	28
Nunn Lake	10	55	15	104	20
Big Whitemouse L.	10	55	15	104	12
Lac La Ronge	2,3,4,6,10,11,12,43	55	10	105	0
Hunter Bay	3,10	55	10	104	30

Table G-19 Directory of Lakes on Canoe Routes, East-West Listing

Lake	Canoe Routes	Position			
Reindeer Lake	35,39,51	56	30	103	0
Steephill River	34,35	55	58	103	8
Reindeer River	34,35,39,51	55	36	103	11
Wapiskau River	34,35	56	1	103	21
Frog Portage	5	55	24	103	31
Brabant Lake	27,33,34,35	56	0	103	43
Redhill Lake	53	56	9	103	45
Waddy River	53	56	8	103	45
Waddy Lake	53	56	20	103	50
Macoun Lake	53	56	32	103	50
Nayelles Lake	53	56	20	103	50
Elephant Lake	53	56	24	103	52
Nistoassini Lake	53	56	18	103	55
Kakabigish Lake	27,33	55	51	104	0
Settee Lake	32,33	55	50	104	4
Whitemoose River	10	55	23	104	10
MacLean Lake	31	55	55	104	10
Big Whitemouse L.	10	55	15	104	12
Colin Lake	33	55	49	104	14
Kemp Lake	27	55	39	104	17
McLennan Lake	31,32,33	55	54	104	20
Davis Lake	31,32,33	55	52	104	20
Nistowiak Lake	11,12	55	25	104	20
Nunn Lake	10	55	15	104	20
Versailles Lake	31,32,33	55	49	104	20
Iskwatikan Lake	2,3,7,8,9,10,11,12	55	22	104	22
Thomas Lake	3	55	17	104	28
Hunter Bay	3,10	55	10	104	30
Mountain Lake	4,27,32	55	29	104	30
Hale Lake	2	55	21	104	31
Churchill River	7,8,9,10,16,17,29,34,36,37,39,	55	24	104	33
Rattler Creek	30	55	38	104	33
Otter Lake	2,3,4,5,6,12,16,17,27,29,30,32	55	35	104	39
Grandmother's Bay	30	55	37	104	40
Hunt Lake	4,11	55	24	104	41

Continued.......

Table G-19 Directory of Lakes on Canoe Routes, East-West Listing (continued)

Lake	Canoe Routes	Position			
Ducker Lake	30	55	38	104	45
Freestone Lake	21	55	27	104	45
Stroud Lake	4,11	55	21	104	45
Freda Lake	6,12,21	55	25	104	47
Hebden Lake	21	55	27	104	48
Paull Lake	36,37	56	8	104	50
Contact Lake	20,21	55	25	104	52
Kuskawao Lake	20	55	27	104	53
Sulphide Lake	6,12,20,21	55	22	104	54
MacKay Lake	37	55	27	104	56
French Lake	30	55	38	104	57
Lynx Lake	6,12,20,21	55	21	104	58
Bassett Lake	37	55	35	104	59
Lac La Ronge	2,3,4,6,10,11,12,43	55	10	105	0
Kavanagh Lake	37	55	36	105	2
Wadin Bay	10	55	17	105	5
Paull River	36,37	55	49	105	7
Trout Lake	16,18	55	37	105	16
Nemeiben Lake	16,17,18	55	20	105	20
Black Bear Island	10,54,57	55	38	105	40
Buss Lake	53	55	53	105	53
Besnard Lake	17,18,54	55	25	106	0
Sandfly Lake	54	55	43	106	6

Table G-20 Documented Canoe Routes in Study Area

No.	Start Location	End Location	Km.	Days	Portages
2	Otter Lake	La Ronge	120	5	5
3	Otter Lake	La Ronge	144	6 to 7	7
4	Otter Lake	La Ronge	126	4 to 6	6-9
5	Otter Lake	Pelican Narrows	160	6 to 7	13
6	La Ronge	Otter Lake	92	4 to 5	12
7	La Ronge	Highway 106, M.146	282	8 to 10	13-14
8	La Ronge	Jan Lake	238	6 to 8	12
9	La Ronge	Highway 106, M.190	243	7 to 10	15
10	Wadin Bay	Wadin Bay	203	7 to 10	14
11	La Ronge	La Ronge	171	6	7
12	La Ronge	La Ronge	193	8 to 10	17
16	Nemeiben Lake	Otter Lake	101	4 to 6	13-15
17	Nemeiben Lake	Otter Lake	160	7 to 9	19
18	Nemeiben Lake	Nemeiben Lake	165	5 to 8	18
20	Lynx Lake	Kuskawao Lake	21	1 to 2	7
21	Lynx Lake	Lynx Lake	53	2 to 4	19
27	Brabant Lake	Otter Lake	124	5 to 6	14
29	Otter Lake	Sandy Bay	225	9 to 12	16-19
30	Otter Lake	Otter Lake	35	1 to 2	3
31	McLennan Lake	McLennan Lake	45	2 to 3	8
32	McLennan Lake	Otter Lake	109	5 to 6	18
33	Brabant Lake	McLennan Lake	93	4 to 5	12
34	Brabant Lake	Sandy Bay	225	10 to 14	21-25
35	Brabant Lake	Southend	113	5 to 7	15-16
36	Paull Lake	Otter Lake	80	4 to 5	16-17
37	Paull Lake	MacKay Lake	89	5 to 6	20-21
39	Southend	Sandy Bay	201	8 to 12	9-13
43	Lac La Ronge	Ballantyne Bay	169	7 to 9	17
51	Sandy Bay	Southend	187	7 to 9	21
53	Waddy River	Wathaman River	145	6 to 8	23
54	Besnard Lake	Besnard Lake	180	6 to 8	8-9
57	Lower Foster Lake	Otter Lake	233	8 to 10	27-30

SECTION H
HERITAGE
RESOURCES

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APPENDIX 1. TABLES

1.0 INTRODUCTION

This section of the report provides a comprehensive summary of the heritage resource data available for the La Ronge Greenstone Belt. Heritage resources in the area consist of prehistoric archaeological sites as well as historic remains and artifacts post-dating the arrival of Europeans and Euro-Canadians in the region. This review is presented as follows. First, heritage resource sites and site types are defined. Second, site distribution patterns are presented. Summaries of previous research are described next. Finally, data sources and references are given. All data are summarized in tables, with appropriate definitions of topic headings described in the following text. General locations of heritage resource sites are presented in Map H, found in the map pocket at the back of this report.

2.0 HERITAGE RESOURCE SITES

2.1 Archaeological Sites

Archaeological sites are considered locations where evidence of prehistoric human activity have been recorded. Prehistoric occupation of the region likely began shortly after de-glaciation, coincident with the re-establishment of habitats sufficient to sustain human utilization. This occurred approximately 9,000 years ago, and persisted until the arrival of Europeans, or approximately A.D. 1750-1775.

Archaeologists have divided the prehistoric era into three sub-periods. The early prehistoric period is known as Paleo-Indian and dates between approximately 9,000 and 7,000 years before present. Although no sites have been excavated from this age within the La Ronge Greenstone Belt, data from nearby regions suggest that a subsistence economy based on hunting of southern caribou or northern bison herds characterizes this period.

The second sub-period is known as the Middle Prehistoric, or Archaic Period. It dates between approximately 7,000 and 1,900 years before present. Archaeological sites dating to this period are somewhat more frequent in northern Saskatchewan. Researchers suggest that there was greater use of the region at this time, compared with the previous period, and a more diversified economic base.

The late prehistoric, or Woodland Period, dates between approximately 1,900 years before present and A.D. 1750-1775. Woodland Period sites are represented by the appearance of ceramics, quite diversified resource exploitation patterns, more numerous, more extensive and more complex sites. The earliest ceramic style is known as Laurel, and dates between A.D. 100 and A.D. 1000. Laurel was succeeded by Blackduck, which is believed to date from roughly A.D. 800 to A.D. 1400.

The most recent ceramic complex is known as the Clearwater Lake phase, and is postulated to represent ancestral Woodland Cree. It dates between about A.D. 1300 and A.D. 1750-1775. The reader is referred to Meyer (1983c) for a more comprehensive summary of prehistory in northern Saskatchewan.

2.1.1 Archaeological Site Types

A number of specific site types have been recorded in the region. Each is defined below.

Habitation (or camp) sites consist of locations where substantial amounts of cultural material have been found. The material may consist of ceramics, finished stone tools (such as projectile points, bifaces and scrapers), retouched debitage, unretouched debitage, bone and fire-cracked rock. When excavated, these sites will produce evidence of habitation structures and features relating to butchering, food processing and hide preparation. Campsites may be characterized by small amounts of cultural material representing single occupations, or they may be characterized by substantial amounts of cultural material, representing frequent reoccupation of a specific locality.

Lithic scatter sites contain varying amounts of lithic artifacts, but few diagnostic tools. Unretouched debitage and cores are the most frequently found artifacts. These sites tend to be smaller in size than habitation sites, and site function is often difficult to determine.

Workshops, or workshop sites, are usually void of diagnostic tools. Instead, workshops consist of cores and lithic debitage in various stages of reduction. These sites may sometimes be associated with naturally occurring veins of raw material suitable for stone tool manufacture, such as quartz, quartzite or chert, but may also be found near glacially deposited cobble or boulder concentrations. When the raw material is believed to have been removed from veins or bedrock by human activity, researchers will record the site as a quarry.

Isolated finds, or "find-spots" consist of single cultural items, generally lithic debitage, a finished stone tool such as a projectile point, or a ceramic item.

Pictograph sites are aboriginal paintings on rock surfaces. Petroglyphs, on the other hand, are a result of rock pecking or etching. Both sites tend to be situated on rock faces, usually low cliffs, along watercourses protected to some degree by wave-action.

Stone circles or boulder circles consist of human arrangements of naturally occurring cobbles and boulders. These sites may simply represent the outlines of habitation tents, sweat lodges, menstrual huts or large campfires. Or, they may be vision quest structures.

Cairns are rock piles or dense stone concentrations. Little is known of these sites, since they are frequently void of cultural material. They may represent a variety of functions including caches, trail markers and blinds, or they may have been used as markers of important people or events.

2.2 Historic Site

2.2.1 Historic Site Types

Historic sites post-date the arrival of Europeans in the region, roughly the mid-1700s. Each site is so defined either as a result of structural remains or the presence of European manufactured artifacts.

Cabins are the most visible historic sites. Archaeologists and historians conducting field work in the region have recorded these structures as being present, but seldom recorded their age or architectural characteristics. Structural remains also have been recorded, but the information is insufficient in most instances to determine type or function. It may be assumed, however, that "cabins" are extant structures related to trapping, hunting and fishing, whereas "structural remains" may be burned or badly decomposed buildings.

Fur-trade posts are perhaps the most notable historic sites in the region. Researchers have recorded a number of possible posts related to the Hudson Bay Company (HBC), the Northwest Company (NWC) and various independent companies and individuals. Unfortunately, little detailed research has been conducted at these sites, and assignment to a specific time or company is only tentative.

Campsites relating to the historic period have also been recorded fairly frequently. Researchers have tended to list contemporary hunting, fishing and trapping sites, in addition to older sites which may relate to the fur-trade period. In either case, the presence of European and Euro-Canadian artifacts differentiate these sites from prehistoric sites. It should be noted also that many prehistoric campsites also contain historic and comtemporary components, indicating persistent utilization of select localities over long periods of time.

The Holy Trinity Anglican Church in Stanley Mission is the only extant mission church in the region recorded in the Saskatchewan Government's inventory of historic buildings. It is also likely the oldest standing structure in the province, being built between 1854 and 1860.

Other historic site types recorded in the region consist of isolated finds of historic items and portage trails.

Heritage resource site data are summarized in Table H-1. Sites are listed according to 1:50,000-scale N.T.S. sheets and Borden Unit. Borden Units are a national site numbering system utilized by prehistoric and historic archaeologists. Capital letter designations denote an area 2 degrees latitude by 4 degrees longitude, whereas lower-case letters denote an area 10 minutes latitude by 10 minutes longitude. Sequential numbers are assigned by the Archaeological Resource Management Section (ARMS) of Saskatchewan Culture and Recreation to all heritage sites recorded within the unit, and the precise location is drawn on 1:50,000 N.T.S. sheets. For purposes of this report, one to two Borden Units on either side of the designated zone were also scrutinized. Precise site location is identified as U.T.M. Location, recorded directly from N.T.S. sheets at ARMS. The general location is also given.

In nearly all cases the sites have been recorded adjacent to, or in close proximity to, major waterbodies; the exception is HbMu-f.s.l. Sites, further subdivided by historic and prehistoric components, are so identified. Site file data were far too tentative to assign a precise date to most historic sites. Stanley Mission is a notable exception. Precise cultural affiliation and age has not been recorded for the majority of prehistoric sites, as well. Most often, this is due to lack of data at the sites. Those sites known to contain late prehistoric Laurel components are GiMv-1, GiNb-4, GkMs-17 and HbMs-11.

Only GiMv-1 is listed in the site inventory as containing Blackduck ceramics. Clearwater Lake occupation has been recorded at GiMv-1, GiMw-18, GiMx-8, GiMx-15, GhNe-6, GgNh-11, GiNb-1, GjMt-28, GlMr-1 and HaMs-13. The reader is referred to Meyer (1978b, 1983a and b) for a more detailed discussion of the late prehistoric period in northern Saskatchewan. Finally, Table H-1 lists site type, as per previously defined categories.

3.0 HERITAGE RESOURCE SITE DISTRIBUTION PATTERNS

Heritage resource site distribution according to N.T.S. sheet is presented in Table H-2. Table H-3 lists sites according to Borden Unit, and Table H-4 presents site location according to waterbody. Collectively, the data indicate that most sites have been recorded on several major waterbodies. The Churchill River and its associated lakes (Drinking Lake, Keg Lake, Ourom Lake and Trade Lake) contain the greatest concentrations of sites. Concentrations have also been noted on the Reindeer River (including Steephill Lake) and Lac La Ronge.

Information available to date suggests that nearly all heritage resource sites in the region are restricted to the above named waterbodies. In reality, this may not be correct. Previous research has tended to concentrate almost exclusively on the major waterbodies particularly the Churchill and Reindeer Rivers and Lac La Ronge. Until an equal amount of study has been directed at other waterbodies, precise site distribution patterns remain unclear. Furthermore, research has not been undertaken to any great extent in areas inland from waterbodies. Most researchers concentrated their efforts along narrow bands of lake shoreline or river edges. Therefore, little is known of inland site distribution patterns, site types and site characteristics.

4.0 HERITAGE RESOURCE SITE SUMMARY

Tables H-5 and H-6 summarize site period and site type data, respectively. Slightly more than two-thirds of all sites recorded in the region to date are prehistoric in age. It is also noteworthy that one-fifth of all sites recorded thus far are historic. Extensive utilization of the region during the fur-trade period may account for the substantial number of historic sites. Campsites (both historic and prehistoric) are the most frequently recorded site type, accounting for just over one-half of the total. Prehistoric lithic scatters constitute nearly one-quarter of all recorded sites. Most heritage sites appear to be of a single type, since sites having multiple functions or features comprise only 1.6 percent of the total.

5.0 DATA SOURCES AND CONTACTS

Heritage resource baseline data for the La Ronge Greenstone Belt have been compiled from a number of sources (Table H-7). Primary site data (individual site forms and 1;50,000 N.T.S. sheets) are located at the Archaeological Resource Management Section (ARMS) of Saskatchewan Culture and Recreation, Regina. This office is a repository of forms on all prehistoric sites and historic structures recorded in the province. In addition, their library contains the majority of research and heritage resource impact assessment reports on the region. Saskatchewan Archaeological Society (SAS) periodicals and general publications on the history of the region are available, as well.

The Saskatchewan Museum of Natural History, Regina, contains all reports, overviews and publications relating to the Churchill River study. This study was conducted in the early to mid-1970s in response to proposed hydro-electric developments on the Churchill River. The Museum holds a substantial number of unpublished reports, diaries and field notes relating to early (1950 to late 1960s) archaeological, historical and rock art studies of the region. General publications and SAS periodicals are also located here.

Additional impact assessment and research reports concerning the Churchill River study are located at the Saskatchewan Research Council (SRC), Saskatoon. Individuals associated with this organization, perhaps more than any other organization or institution, have conducted the majority of archaeological research in the region. Also, SRC is an source of reports, field survey and excavation notes pertaining to selected sites listed in Table H-1.

Individuals with the Department of Anthropology and Archaeology, University of Saskatchewan are responsible for a great deal of the data pertaining to rock art sites in the region. Appropriately, the department holds M.A. theses, student papers, reports, field notes, photographs and drawings.

General publications pertaining to rock art, the fur-trade period and European exploration of the region can be found in both university libraries, although selected titles are also available at ARMS, the Museum and SRC. The University of Saskatchewan library archives also holds the Aurthor S. Morton collection, containing personal research notes and records relating to the region's early exploration and fur-trade period.

Most reports and publications listed in the present report contain bibliographies relating to the particular title's topic or research objective. For example, Korvemaker's (1982) bibliography lists original archival sources as well as reports and records used to compile the publication. Only those titles not published in Korvemaker (1982) are given in the present report. The reader is referred to each title's bibliography for additional, related sources.

Map H, found in the map pockets at the back of this report, identifies 1:50,000 N.T.S. sheets of the La Ronge Greenstone Belt. It also shows the location of Borden Units listed in Table H-1. The reader is referred to U.T.M. Location (Table H-1) for precise site locations.

Table H-8 is a topical summary of available heritage resource references for the La Ronge Greenstone Belt.

6.0 BIBLIOGRAPHY

Brace, Ian G. and Ian G. Dyck
1978 The M.A. Welsh Collection. Saskatchewan Archaeology Newsletter 53(#): 6-12.

Brown, James A.
1960 A report on Archaeological Reconnaissance in Northern Saskatchewan - 1960. Unpublished manuscript on file, Saskatchewan Museum of Natural History, Regina.

Canadian Inventory of Historic Buildings (C.I.H.B.)
n.d. Canadian Historic Sites. Vol. 25: 17.

Churchill River Study Board
1975 A Picture Primer on the Churchill River Basin. Bulletin 7. Report on file, Saskatchewan Museum of Natural History, Regina.

Davies, W. A.
1975 A Brief History of the Churchill River. The Musk-Ox No. 15: 30-38.

Dewdney, Selwyn
1962 Pictographs - 1962: Saskatchewan Sites. Unpublished manuscript on file, Saskatchewan Museum of Natural History.

1963a Pictograph Recording Project Alberta, Saskatchewan and Manitoba. Unpublished manuscript of file, Saskatchewan Museum of Natural History.

1963b Indian Rock Art. Popular Series No.4, Saskatchewan Museum of Natural History, Regina.

Dewdney, Selwyn and Kenneth E. Kidd
1962 Indian Rock Paintings of the Great Lakes. University of Toronto Press, Toronto.

Downes, P.
1938 Reindeer Lake Pottery. American Antiquity 4(48-51).

Epp, Henry T.
1973 Approach to Field Activities, Churchill River Archaeological Survey. Unpublished manuscript on file, Saskatchewan Museum of Natural History, Regina.

Epp, Henry T. and David Meyer
1973 Operational Plan for 1973 Field Work, Churchill River Archaeological Project. Manuscript prepared for Department of Natural Resources. On file, Saskatchewan Museum of Natural History, Regina.

F. F. Slaney and Company, Ltd.
1973 Appendix Folio III Methodology For Synthesis and Evaluation of Environmental Impact, Churchill River Study, Saskatchewan. Report prepared for Department of Environment, Saskatchewan Power Corporation Interim Churchill Basin Study Board, Regina. On file, Archaeological Resource Management Section, Saskatchewan Culture and Recreation, Regina.

Fedge, Allan
1976 A Study of Pottery and Lithics of the Southend Area - Reindeer Lake. Saskatchewan Archaeology 52: 24-25.

Government of Saskatchewan
1986a Archaeological site files, Archaeological Resource Management Section, Saskatchewan Culture and Recreation, Regina.

1986b Historic sites records, Saskatchewan Culture and Recreation, Regina.

1986c Saskatchewan Historic Sites Inventory Fur Trade Establishments, Master File, Saskatchewan Culture and Recreation, Regina.

Harper, C. T.
1985 Sites in Northern Saskatchewan. Saskatchewan Archaeological Society Newsletter 6(4): 46-51.

Henry the Younger, Alexander
1965 The Manuscript Journals of Alexander Henry and of David Thompson, 1799-1814, 3 Volumes. edited by Elliott Coues, reprinted, Ross and Haines, Minneapolis.

Jones, Tim Edward Hodgson
1974 The Aboriginal Rock Paintings of the Churchill River. Unpublished M.A. Thesis, Department of Anthropology and Archaeology, University of Saskatchewan, Saskatoon.

1981 The Aboriginal Rock Art Paintings of the Churchill River. Saskatchewan Museum of Natural History Anthropological Series No. 4, Saskatchewan Museum of Natural History, Regina.

Korvemaker, E. Frank
1982 Holy Trinity Anglican Church Stanley Mission. Saskatchewan Culture and Recreation, Regina.

La Ronge Heritage Committee
1981 Our Roots: A History of La Ronge. Lakeland Press, La Ronge.

Light, James
1980 Archaeological Survey of Lower Potato Point Recreational Subdivision. Saskatchewan Research Council Report 101 (C-805-S-1-B-80), Saskatoon.

Meyer, David
1974 Churchill Archaeology Study, unpublished report prepared for Churchill River Study Workshop II, October 2-4, Prince Albert.

1975 Archaeology. in Proceedings of Workshop 2, Churchill River Study (Missinipe Probe), Judith Mitchell and J. S. Wilson, editors. Bulletin No. 6, Churchill River Study Board, Saskatoon. Report on file, Saskatchewan Museum of Natural History, Regina.

1978a Prehistoric Pottery from Northern Saskatchewan. Napao 8: 5-30.

1978b The Clearwater Lake Phase: A Saskatchewan Perspective. Archae-Facts. 5(2,3): 27-42.

1983a Blackduck and Laurel Occurrences at Southend, Reindeer Lake. Saskatchewan Archaeology 4: 39-40.

1983b Saskatchewan Laurel: An Overview. Saskatchewan Archaeology 4: 3-24.

1983c The Prehistory of Northern Saskatchewan. in Tracking Ancient Hunters: Prehistoric Archaeology in Saskatchewan, Saskatchewan Archaeological Society, Regina.

Meyer, David and Sydney J. Smailes

1974 Churchill Archaeology Study Impact Statement. Report prepared for the Churchill River Environmental Impact Study. Report on file, Saskatchewan Museum of Natural History, Regina.

1975 Churchill River Study (Missinipe Probe) Archaeology. Final Report No. 19, Department of Tourism and Renewable Resources. Report on file, Archaeological Resource Management Section, Saskatchewan Culture and Recreation, Regina.

Moody, R. H.

n.d. Search for Historic Sites in Amisk Lake Area. Unpublished manuscript on file Saskatchewan Museum of Natural History, Regina.

1954 Diary of Search, Beaver Lake. Unpublished manuscript on file, Saskatchewan Museum of Natural History, Regina.

1956 Diary of Historical Research. Unpublished manuscript on file, Saskatchewan Museum of Natural History, Regina.

1958 Diary of 1958. Unpublished manuscript on file, Saskatchewan Museum of Natural History, Regina.

Morse, E.W.

1969 Fur Trade Routes / Then And Now. Queen's Printer, Ottawa.

Morton, Arthur S.

1973 A History of the Canadian West to 1870-71, Second Edition. University of Toronto Press, Toronto.

Murray, Jeffrey S.

1981a Archaeological Investigations at Holy Trinity Church, Saskatchewan. Report on file, Prairie Region Office, Parks Canada, Winnipeg.

1981b Current Research: Historic Archaeology at Holy Trinit Church, Stanley Mission. Saskatchewan Archaeological Society Newsletter 2(6): 10.

1981c Holy Trinity Church, Stanley Mission, Saskatchewan. Research Bulletin No. 181. Prairie Region Office, Parks Canada, Winnipeg.

Pohorecky, Z.
1981 Human Figures in Northwestern Shield Paintings. CRARA Newsletter 16 (Nov.): 12-17.

Rich, E. E.
1960 Hudson's Bay Company 1670-1870, 3 Volumes. McClelland and Stewart, Toronto.

1967 The Fur Trade and the Northwest to 1857. McClelland and Stewart, Toronto.

Rostecki, R. R. and Janet Wright
1976 Holy Trinity Church, Stanley Mission, Saskatchewan. Agenda Paper Historic Sites and Monuments Board of Canada, Prairie Region Office Parks Canada, Winnipeg.

Saskatchewan Museum of Natural History
1972 A Proposal for Evaluation of Historic Resources in the Saskatchewan Portion of the Churchill River Basin. Proposal submitted to Churchill River Basin Task Force. On file, Saskatchewan Museum of Natural History, Regina.

Schmidt, A. P., D. A. Meyer, E. W. Sawchyn
1978 Environmental Overview for the Proposed Hydro-electric Development on the Rapid River. Unpublished report on file, Saskatchewan Museum of Natural History, Regina.

Smailes, Sydney J.
1979 Prehistory of the Trade Lake Site, GiMw-18. Report on file, Saskatchewan Museum of Natural History, Regina.

Smith, Brian J.
1986 Report on Archaeological Investigations of the Heritage Resources of the Southern End of Reindeer Lake and the Reindeer River Systems to Royal Lake, Saskatchewan. Manuscript on file, Department of Anthropology and Archaeology, University of Saskatchewan, Saskatoon.

Smythe, Terry
1968 Thematic Study of the Fur Trade in the Canadian West 1670-1870. Agenda Paper of the Historic Sites and Monuments Board of Canada.

Spurling, Brian E.
1980 A Relatively Complete Clearwater Lake Pot Found in Lac La Ronge. Saskatchewan Archaeological Society Newsletter 1(5): 11-14.

Stewart, W. D. and J. Foraie
1974 Draft Churchill River Study Environmental Impact Evaluation. Report prepared for Canadian Plains Research Center, University of Regina. On file, Saskatchewan Museum of Natural History, Regina.

Thompson, David
1962 David Thompson's Narrative, Vol. 40. edited by Richard Glover, The Champlain Society, Toronto.

1968 David Thompson's Narrative of His Explorations in Western America: 1784-1812 Vol. 12. edited by J. B. Tyrrell, reprinted, Greenwood Press, New York.

Turner, A. R.
1958 Fur Trade Posts At Rapid River and Lac La Ronge. Unpublished report on file, Saskatchewan Museum of Natural History, Regina.

Tyrrell, J. B.
1896 Geological Survey Annual Report 9: 104.

1934 Journals of Samuel Hearne and Phillip Turnor. The Champlain Society, Toronto.

University of Saskatchewan
1986 University of Saskatchewan Library Archives, Arthur S. Morton collection, Saskatoon.

Wilson, James S. and James Light
1980 Archaeological Resource Survey of Lac La Ronge Provincial Park, Northern Saskatchewan. Saskatchewan Research Council Report No. 104, Saskatoon.

APPENDIX H-1. TABLES

APPENDIX H-1. TABLES

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Table H-1. Heritage resource site summary, La Ronge Greenstone Belt.

NTS. Sheet	Borden Unit	Site No.	U.T.M. Location	General Location	Period*	Site Type
63 M/4	GgMv	0	-	-	-	-
	GgMw	0	-	-	-	-
	GgMx	0	-	-	-	-
	GhMv	0	-	-	-	-
	GhMw	0	-	-	-	-
	GhMx	0	-	-	-	-
63 M/5	GhMv	0	-	-	-	-
	GhMw	1	13UEM 776/276	Sadler Lake	P	lithic scatter
		2	13UEM 763/286	Sadler Lake	P	campsite
		3	13UEM 788/268	Sadler Lake	P	lithic scatter
		4	13UEM 772/282	Sadler Lake	H	campsite
	GhMw	0	-	-	-	-
	GiMv	1	13UEM 928/398	Churchill River	H,P	Fur-trade post (?)+ campsite
		2	13UEM 927/401	Churchill River	H	Fur-trade post (?)
		3	13UEM 930/398	Churchill River	H	campsite
		4	13UEM 931/396	Churchill River	H	campsite
		5	13UEM 923/435	Churchill River	D.I.‡	
		6	13UEM 913/396	Churchill River	H	campsite
		8	13UEM 883/360	Churchill River	H	cabin
		9	13UEM 848/385	Churchill River	H	cabin
		10	13UEM 880/362	Churchill River	H	campsite
		11	13UEM 850/359	Churchill River	H	campsite
		12	13UEM 883/363	Churchill River	H	campsite
		13	13UEM 890/356	Churchill River	P	lithic scatter
		14	13UEM 932/911	Churchill River	P	lithic scatter
		15	13UEM 927/414	Churchill River	H	cabin
		16	13UEM 922/396	Churchill River	P	lithic scatter
		17	13UEM 914/394	Churchill River	H	campsite
		18	13UEM 926/404	Churchill River	H	campsite
		19	13UEM 924/416	Churchill River	P	lithic scatter
		20	13UEM 924/403	Churchill River	H,P	campsite
		21	13UEM 924/413	Churchill River	H	campsite
		22	13UEM 933/411	Churchill River	P	lithic scatter
		23	13UEM 917/397	Churchill River	P	campsite
		24	13UEM 933/407	Churchill River	P	campsite
		26	13UEM 930/402	Churchill River	H	campsite
		27	13UEM 916/397	Churchill River	P	campsite
		28	13UEM 907/397	Churchill River	P	campsite
		29	13UEM 899/393	Churchill River	P	campsite
		30	13UEM 912/394	Churchill River	H	campsite
		31	13UEM 921/398	Churchill River	H	campsite
		32	13UEM 914/393	Churchill River	H	campsite

Table H-1 (cont.). Heritage resource site summary, La Ronge Greenstone Belt.

NTS. Sheet	Borden Unit	Site No.	U.T.M. Location	General Location	Period*	Site Type
		33	13UEM 924/395	Churchill River	H	campsite
		34	13UEM 927/404	Churchill River	H,P	campsite
		37	13UEM 920/437	Churchill River	H	campsite
63 M/5	GiMw	1	13UEM 748/347	Trade Lake	H,P	campsite
		2	13UEM 755/362	Trade Lake	H	cabin
		3	13UEM 773/401	Trade Lake	P	campsite
		4	13UEM 777/419	Trade Lake	P	lithic scatter
		5	13UEM 779/406	Trade Lake	P	lithic scatter
		6	13UEM 785/392	Trade Lake	P	lithic scatter
		7	13UEM 783/390	Trade Lake	P	workshop
		8	13UEM 785/387	Trade Lake	P	lithic scatter
		9	13UEM 774/348	Trade Lake	H,P	campsite
		10	13UEM 7435/350	Trade Lake	H	campsite
		11	13UEM 745/355	Trade Lake	H	campsite
		12	13UEM 743/356	Trade Lake	P	cabin
		13	13UEM 740/355	Trade Lake	H	cabin
		14	13UEM 747/368	Trade Lake	H	cabin
		16	13UEM 742/366	Trade Lake	H	campsite
		18	13UEM 754/338	Trade Lake	P	campsite
		20	13UEM 768/351	Trade Lake	P	lithic scatter
		21	13UEM 770/353	Trade Lake	H	campsite
		22	13UEM 746/341	Trade Lake	H	campsite
		23	13UEM 813/367	Trade Lake	H	campsite
		24	13UEM 813/369	Trade Lake	P	campsite
		25	13UEM 819/377	Trade Lake	P	lithic scatter
		26	13UEM 793/367	Trade Lake	H	campsite
		27	13UEM 820/374	Trade Lake	H	campsite
		28	13UEM 812/374	Trade Lake	P	lithic scatter
		29	13UEM 814/373	Trade Lake	P	lithic scatter
		31	13UEM 814/373	Trade Lake	P	campsite
		32	13UEM 828/380	Trade Lake	P	campsite
		33	13UEM 831/386	Trade Lake	P	stone circle
		34	13UEM 804/374	Trade Lake	P	lithic scatter
		35	13UEM 817/372	Trade Lake	H	campsite
		36	13UEM 817/374	Trade Lake	H	campsite
		37	13UEM 843/348	Trade Lake	P	lithic scatter
	GiMx	1	D.I.	Churchill River	H	portage trail
		2	13UEM 737/351	Churchill River	H	campsite

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Table H-1 (cont.). Heritage resource site summary, La Ronge Greenstone Belt.

NTS. Sheet	Borden Unit	Site No.	U.T.M. Location	General Location	Period*	Site Type
		3	13UEM 720/392	Keg Lake	P	lithic scatter
		4	13UEM 717/389	Keg Lake	P	lithic scatter
		5	13UEM 715/382	Keg Lake	P	lithic scatter
		6	13UEM 6605/396	Keg Lake	H	campsite
		7	13UEM 704/372	Churchill River	H	campsite
		8	13UEM 719/388	Keg Lake	P	campsite
		9	13UEM 686/404	Keg Lake	P	campsite
		10	13UEM 714/394	Keg Lake	P	lithic scatter
		11	13UEM 714/395	Keg Lake	P	lithic scatter
		12	13UEM 668/394	Keg Lake	P	lithic scatter
		13	13UEM 698/387	Keg Lake	H	isolated find
		14	13UEM 714/353	Churchill River	P	campsite
		15	13UEM 715/346	Churchill River	H,P	campsite
		16	13UEM 713/353	Churchill River	P	campsite
		17	13UEM 7205/353	Churchill River	H,P	campsite
		18	13UEM 715/348	Churchill River	H	campsite
		19	13UEM 705/395	Keg Lake	P	lithic scatter
		20	13UEM 705/394	Keg Lake	P	campsite
		21	13UEM 707/394	Keg Lake	P	lithic scatter
		22	13UEM 712/389	Keg Lake	P	campsite
		23	13UEM 707/384	Keg Lake	P	lithic scatter
		24	13UEM 685/396	Keg Lake	H,P	campsite
		25	13UEM 693/399	Keg Lake	P	lithic scatter
		26	13UEM 738/348	Churchill River	H	campsite
		27	13UEM 657/410	Keg Lake	P	campsite
		28	13UEM 718/356	Churchill River	P	campsite
63 M/11	GjMs	1	13UFM 165/591	Churchill River	P	campsite
		2	13UFM 166/590	Churchill River	P	campsite
		3	13UFM 165/588	Churchill River	H,P	campsite
		4	13UFM 170/592	Churchill River	P	campsite
		5	13UFM 176/588	Churchill River	H	campsite
		6	13UFM 173/590	Churchill River	P	campsite
		7	13UFM 173/588	Churchill River	H	campsite, boulder circle
		8	13UFM 177/592	Churchill River	D.I.	D.I.
		9	13UFM 167/584	Churchill River	P	campsite
		10	13UFM 169/584	Churchill River	P	campsite
		11	13UFM 164/585	Churchill River	P	campsite
		12	13UFM 168/584	Churchill River	P	campsite

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Table H-1 (cont.). Heritage resource site summary, La Ronge Greenstone Belt.

NTS. Sheet	Borden Unit	Site No.	U.T.M. Location	General Location	Period*	Site Type
		13	13UFM 165/585	Churchill River	P	campsite
		14	13UFM 166/585	Churchill River	H	cabins
		15	13UFM 206/606	Churchill River	P	lithic scatter
		16	13UFM 170/583	Churchill River	H,P	campsite
		17	13UFM 171/582	Churchill River	D.I.	D.I.
		18	13UFM 1705/583	Churchill River	D.I.	D.I.
		19	13UFM 172/581	Churchill River	P	lithic scatter
		20	13UFM 210/605	Churchill River	P	campsite
		21	13UFM 193/558	Churchill River	P	campsite
		22	13UFM 169/583	Churchill River	H	Fur-trade post Fairford House(?)
		23	13UFM 186/552	Churchill River	H	Fur-trade post Raymond's House(?)
	GjMt	1	13UFM 101/549	Uskik Lake	P	campsite
		2	13UFM 101/550	Uskik Lake	H,P	campsite
		3	13UFM 095/550	Uskik Lake	H	structural remains
		4	13UFM 098/553	Uskik Lake	H,P	campsite
		5	13UFM 091/564	Uskik Lake	P	pictograph
		6	13UFM 057/553	Uskik Lake	H	campsite
		7	13UFM 147/601	Ourom Lake	H	campsite
		8	13UFM 148/596	Ourom Lake	H,P	campsite
		9	13UFM 124/584	Ourom Lake	P	lithic scatter
		10	13UFM 115/577	Ourom Lake	P	campsite
		11	13UFM 148/594	Ourom Lake	H,P	campsite
		12	13UFM 124/601	Ourom Lake	D.I.	D.I.
		13	13UFM 125/586	Ourom Lake	P	lithic scatter
		14	13UFM 126/585	Ourom Lake	P	lithic scatter
		15	13UFM 116/575	Ourom Lake	P	campsite
		16	13UFM 117/578	Ourom Lake	P	lithic scatter
		17	13UFM 115/574	Ourom Lake	P	lithic scatter
		18	13UFM 117/582	Ourom Lake	P	lithic scatter
		19	13UFM 065/547	Uskik Lake	P	lithic scatter
		20	13UFM 125/594	Ourom Lake	H	campsite
		21	13UFM 125/597	Ourom Lake	P	campsite
		22	13UFM 128/599	Ourom Lake	P	campsite
		23	13UFM 148/646	Reindeer River	H	campsite
		24	13UFM 144/644	Reindeer River	H	campsite
		25	13UFM 144/643	Reindeer River	H	campsite
		26	13UFM 143/593	Ourom Lake	H	campsite
		27	13UFM 135/593	Ourom Lake	H	campsite

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Table H-1 (cont.). Heritage resource site summary, La Ronge Greenstone Belt.

NTS. Sheet	Borden Unit	Site No.	U.T.M. Location	General Location	Period*	Site Type
		28	13UFM 143/590	Ourom Lake	H,P	campsite
		29	13UFM 152/601	Ourom Lake	H,P	campsite
		30	13UFM 149/595	Ourom Lake	P	lithic scatter
		31	13UFM 070/559	Uskik Lake	H,P	campsite
		32	13UFM 147/595	Ourom Lake	H	campsite
	GjMu	0	-	-	-	-
	GkMs	1	13UFM 158/787	Reindeer River	H	campsite
		2	13UFM 154/745	Reindeer River	D.I.	D.I.
	GkMt	1	13UFM 151/749	Reindeer River	P	lithic scatter
		2	13UFM 150/753	Reindeer River	P	campsite
		3	13UFM 143/725	Reindeer River	P	petroglyph(?)
	GkMu	1	13UEM 997/731	Curruthers Lake	H	cabin
63 M/12	GjMv	0	-	-	-	-
	GjMw	0	-	-	-	-
	GjMx	0	-	-	-	-
	GkMv	0	-	-	-	-
	GkMw	0	-	-	-	-
	GkMx	0	-	-	-	-
63 M/13	GkMv	0	-	-	-	-
	GkMw	0	-	-	-	-
	GkMx	0	-	-	-	-
	GlMv	0	-	-	-	-
	GlMw	1	13UEM 746/938	Kelly Lake	P	pictograph
	GlMx	0	-	-	-	-
63 M/14	GkMs	3	13UFM 203/858	Reindeer River	P	campsite
		4	13UFM 209/885	Reindeer River	P	campsite
		5	13UFM 207/870	Reindeer River	P	campsite
		6	13UFM 202/853	Reindeer River	P	campsite
		7	13UFM 182/835	Reindeer River	P	campsite
		8	13UFM 165/810	Reindeer River	H	cabins
		9	13UFM 161/805	Reindeer River	H	cabins
		10	13UFM 1595/805	Reindeer River	P	campsite
		11	13UFM 157/809	Reindeer River	P	campsite
		12	13UFM 169/801	Reindeer River	P	campsite
		13	13UFM 178/836	Reindeer River	H	campsite
		14	13UFM 201/851	Reindeer River	P	campsite
		15	13UFM 178/817	Reindeer River	H,P	campsite

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Table H-1 (cont.). Heritage resource site summary, La Ronge Greenstone Belt.

NTS. Sheet	Borden Unit	Site No.	U.T.M. Location	General Location	Period*	Site Type
		16	13UFM 161/799	Reindeer River	H,P	campsite
		17	13UFM 164/799	Reindeer River	P	campsite
	GkMt	0	-	-	-	-
	GkMu	0	-	-	-	-
	GlMs	1	13UFN 183/008	Steephill Lake	P	campsite
		2	13UFN 189/011	Steephill Lake	P	campsite
		3	13UFN 180/015	Steephill Lake	P	campsite
		4	13UFN 181/018	Steephill Lake	P	lithic scatter
		5	13UFN 180/019	Steephill Lake	P	lithic scatter
		6	13UFN 178/025	Steephill Lake	P	campsite
		7	13UFM 155/975	Steephill Lake	P	lithic scatter
		8	13UFM 158/974	Steephill Lake	P	lithic scatter
		9	13UFN 158/024	Steephill Lake	P	campsite
		10	13UFM 161/981	Steephill Lake	P	campsite
		11	13UFM 166/998	Steephill Lake	P	lithic scatter
		12	13UFM 181/994	Steephill Lake	P	lithic scatter
		13	13UFN 171/028	Steephill Lake	P	campsite
		14	13UFN 189/008	Steephill Lake	P	campsite
		15	13UFN 187/067	Steephill Lake	P	lithic scatter
		16	13UFN 159/025	Steephill Lake	P	campsite
		17	13UFN 172/036	Steephill Lake	P	pictograph
	GlMt	1	13UFN 134/005	Steephill Lake	P	isolated find
		2	13UFN 103/054	Steephill Lake	P	isolated find
	GlMu	0	-	-	-	-
63 M/15	GkMr	0	-	-	-	-
	GlMr	1	13UFM 253/980	Reindeer River	H,P	campsite
		2	13UFM 269/9785	Reindeer River	P	campsite
		3	13UFM 269/978	Reindeer River	P	lithic scatter
		4	13UFM 268/978	Reindeer River	P	campsite
		5	13UFM 255/959	Reindeer River	P	lithic scatter
64 D/2	HaMr	0	-	-	-	-
	HbMr	0	-	-	-	-
64 D/3	HaMs	1	13VFN 161/175	Reindeer River	P	lithic scatter
		2	13VFN 161/172	Reindeer River	P	campsite
		3	13VFN 167/168	Royal Lake	P	campsite
		4	13VFN 179/170	Royal Lake	P	campsite
		5	13VFN 143/185	Reindeer River	H,P	campsite

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Table H-1 (cont.). Heritage resource site summary, La Ronge Greenstone Belt.

NTS. Sheet	Borden Unit	Site No.	U.T.M. Location	General Location	Period*	Site Type
		6	13VFN 147/189	Reindeer River	H	campsite
		7	13VFN 143/189	Reindeer River	P	campsite
		8	13VFN 189/109	Royal Lake	P	campsite
		9	13VFN 191/105	Reindeer River	H	campsite
		10	13VFN 188/107	Reindeer River	P	campsite
		11	13VFN 1895/105	Reindeer River	H,P	campsite
		12	13VFN 190/104	Reindeer River	H,P	campsite
		13	13VFN 190/099	Reindeer River	H,P	campsite
		14	13VFN 190/098	Reindeer River	D.I.	D.I.
		15	13VFN 1895/095	Reindeer River	P	lithic scatter
		16	13VFN 195/090	Reindeer River	P	campsite
		17	13VFN 162/166	Reindeer River	P	campsite
	HaMt	1	13VFN 121/213	Reindeer River	H,P	campsite
		2	13VFN 120/202	Reindeer River	P	campsite
		3	13VFN 121/249	Reindeer River	H	isolated find
		4	13VFN 121/243	Reindeer River	P	campsite
	HaMu	-	-	-	-	-
	HbMs	1	13VFN 161/309	Fafard Lake	P	campsite
		2	13VFN 145/299	Reindeer River	P	campsite
		3	13VFN 143/292	Reindeer River	P	campsite
		4	13VFN 148/297	Reindeer River	P	campsite
		5	13VFN 151/298	Reindeer River	P	lithic scatter
		6	13VFN 163/300	Fafard Lake	P	campsite
		7	13VFN 168/304	Fafard Lake	P	lithic scatter
		8	13VFN 166/304	Fafard Lake	P	lithic scatter
		9	13VFN 153/299	Reindeer River	P	campsite
		11	13VFN 164/311	Fafard Lake	P	campsite
		12	13VFN 170/307	Fafard Lake	H,P	campsite
		13	13VFN 167/311	Fafard Lake	P	lithic scatter
		14	13VFN 167/309	Fafard Lake	P	campsite
		15	13VFN 167/306	Fafard Lake	P	campsite
		16	13VFN 147/335	Marchand Lake	H	Fur-trade post, NWC (?)
		17	13VFN 140/289	Reindeer River	H	campsite
	HbMt	2	13VFN 119/262	Reindeer River	P	campsite
		5	13VFN 136/279	Reindeer River	D.I.	D.I.
	HbMu	0	-	-	-	-
64 D/4	HaMv	0	-	-	-	-
	HaMw	0	-	-	-	-

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Table H-1 (cont.). Heritage resource site summary, La Ronge Greenstone Belt.

NTS. Sheet	Borden Unit	Site No.	U.T.M. Location	General Location	Period*	Site Type
	HaMx	0	-	-	-	-
	HbMv	0	-	-	-	-
	HbMw	0	-	-	-	-
	HbMx	0	-	-	-	-
64 D/5	HbMv	0	-	-	-	-
	HbMw	0	-	-	-	-
	HbMX	2	13VEN 686/354	Nistoassini Lake	P	lithic scatter
	HcMv	0	-	-	-	-
	HcMw	0	-	-	-	-
	HcMx	0	-	-	-	-
64 D/6	HbMs	10	13VFN 192/357	Harriott River	P	campsite
	HbMt	1	13VFN 106/378	Marchand Lake	P	lithic scatter
		3	13VFN 088/381	Marchand Lake	H,P	isolated find (H) lithic scatter (P)
		4	13VFN 074/378	Marchand Lake	P	pictograph
		f.s.2	13VFN 047/442	Little Deer River	D.I.	D.I.
		f.s.3	13VFN 040/439	Little Deer River	D.I.	D.I.
		f.s.4	13VFN 095/382	Marchand Lake	D.I.	D.I.
	HbMu	f.s.1	13VEN 957/422	east of Gloeckler Lake	D.I.	D.I.
	HcMs	1	13VFN 133/624	Reindeer Lake	P	lithic scatter
		2	13VFN 102/534	Reindeer Lake	P	campsite
		3	13VFN 068/452	Reindeer Lake	H	cabin
		4	13VFN 108/563	Reindeer Lake	P	pictograph
		5	13VFN 063/453	Reindeer Lake	P	lithic scatter
		6	13VFN 108/569	Reindeer Lake	P	pictograph
	HcMt	1	13VFN 105/534	Reindeer Lake	P	isolated find
		2	13VFN 102/534	Reindeer Lake	P	campsite
		3	13VFN 068/452	Reindeer Lake	H	cabin
		4	13VFN 108/563	Reindeer Lake	P	pictograph
		5	13VFN 063/453	Reindeer Lake	P	lithic scatter
		6	13VFN 108/569	Reindeer Lake	P	pictograph
	HcMu	1	13VEN 963/469	Henry Lake	P	lithic scatter
		2	D.I.	Henry Lake	P	campsite
64 D/7	HbMr	0	-	-	-	-
	HcMr	0	-	-	-	-

Table H-1 (cont.). Heritage resource site summary, La Ronge Greenstone Belt.

NTS. Sheet	Borden Unit	Site No.	U.T.M. Location	General Location	Period*	Site Type
64 D/10	HdMr	0	-	-	-	-
64 D/11	HdMs	0	-	-	-	-
	HdMt	0	-	-	-	-
	HdMu	0	-	-	-	-
64 D/12	HdMv	0	-	-	-	-
	HdMw	0	-	-	-	-
	HdMx	0	-	-	-	-
73 I/13	GfNj	0	-	-	-	-
	GfNk	0	-	-	-	-
	GfNl	0	-	-	-	-
73 I/14	GfNg	0	-	-	-	-
	GfNh	1	13UDL 840/938	Lac La Ronge	H	cabin
	GfNi	0	-	-	-	-
73 I/15	GfNd	0	-	-	-	-
	GfNe	1	13UEL 113/911	Lac La Ronge	H,P	cabins, campsite
	GfNf	0	-	-	-	-
73 I/16	GfNa	0	-	-	-	-
	GfNb	0	-	-	-	-
	GfNc	0	-	-	-	-
73 P/1	GgNa	0	-	-	-	-
	GgNb	0	-	-	-	-
	GgNc	0	-	-	-	-
	GhNa	0	-	-	-	-
	GhNb	0	-	-	-	-
	GhNc	0	-	-	-	-
73 P/2	GgNd	0	-	-	-	-
	GgNe	0	-	-	-	-
	GgNf	0	-	-	-	-
	GhNd	7	13UEM 214/161	Lac La Ronge	P	campsite
	GhNe	4	13UEM 206/156	Lac La Ronge	P	pictograph
		6	13UEM 190/134	Lac La Ronge	P	isolated find
	GhNf	0	-	-	-	-

Table H-1 (cont.). Heritage resource site summary, La Ronge Greenstone Belt.

NTS. Sheet	Borden Unit	Site No.	U.T.M. Location	General Location	Period*	Site Type
73 P/3	GgNg	1	13UDM 896/117	Lac La Ronge	P	campsite
	GgNh	1	13UDM 809/056	Lac La Ronge	P	isolated find
		2	13UDL 836/965	Lac La Ronge	P	campsite
		3	13UDM 804/050	Lac La Ronge	P	campsite
		4	13UDM 805/048	Lac La Ronge	P	campsite
		5	13UDM 797/048	Montreal River	H,P	Fur-trade post(?), campsite
		6	D.I.	Lac La Ronge	H	Fur-trade post, Norman Irving's, NWC (?)
		7	13UDM 819/052	Lac La Ronge	P	campsite
		8	13UDM 875/087	Lac La Ronge	P	quarry (?)
		9	13UDL 835/964	Potatoe River	H,P	campsite
		10	13UDL 836/963	Lac La Ronge	H	structure
		11	13UDL 836/964	Lac La Ronge	P	campsite
		12	13UDL 835/964	Potatoe River	P	campsite
		13	13UDL 830/960	Potatoe River	H	Fur-trade post, NWC (?)
	GgNi	1	13UDM 768/052	Bigstone Lake	P	campsite
	GgNg	4	13UDM 918/207	Lac La Ronge	P	campsite
		5	13UDM 926/196	Lac La Ronge	P	lithic scatter
		6	13UDM 934/192	Lac La Ronge	P	lithic scatter
	GhNh	0	-	-	-	-
	GhNi	0	-	-	-	-
73 P/4	GgNj	0	-	-	-	-
	GgNk	0	-	-	-	-
	GgNl	0	-	-	-	-
	GhNj	0	-	-	-	-
	GhNk	0	-	-	-	-
	GhNl	0	-	-	-	-
73 P/5	GhNj	0	-	-	-	-
	GhNk	0	-	-	-	-
	GhNl	0	-	-	-	-
	GiNj	0	-	-	-	-
	GiNk	0	-	-	-	-
	GiNl	1	13UDM 427/475	Besnard Lake	P	isolated find

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Table H-1 (cont.). Heritage resource site summary, La Ronge Greenstone Belt.

NTS. Sheet	Borden Unit	Site No.	U.T.M. Location	General Location	Period*	Site Type
73 P/6	GhNg	1	13UDM 897/265	Lac La Ronge	P	campsite
		2	13UDM 898/264	Lac La Ronge	H,P	St. Joseph's Church, campsite
		3	13UDM 896/261	Lac La Ronge	P	campsite
	GhNh	1	13UDM 872/289	Nemeiben Lake	P	lithic scatter
		2	13UDM 890/267	Nemeiben River	P	isolated find
		3	13UDM 874/273	Nemeiben River	P	lithic scatter
		4	13UDM 892/266	Nemeiben River	P	lithic scatter
	GhNi	0	-	-	-	-
	GiNg	0	-	-	-	-
	GiNh	0	-	-	-	-
	GiNi	0	-	-	-	-
73 P/7	GhNd	1	13UEM 249/259	Lac La Ronge	H	Fur-trade post, HBC Post La Ronge (?)
		2	13UEM 246/259	Lac La Ronge	H	cabin
		3	13UEM 269/279	Lac La Ronge	H	Fur-trade post (?)
		4	13UEM 275/297	Lac La Ronge	H	Fur-trade post, Halcyon Outpost #1 (?)
		5	13UEM 215/317	Lac La Ronge	H	Fur-trade post, Halcyon Outpost #2 (?)
		6	13UEM 223/295	Lac La Ronge	H,P	campsite
		8	13UEM 275/297	Lac La Ronge	P	campsite
		9	13UEM 241/289	Lac La Ronge	P	lithic scatter
		10	13UEM 247/255	Lac La Ronge	P	lithic scatter
		11	13UEM 265/285	Lac La Ronge	P	lithic scatter
		12	13UEM 286/307	Lac La Ronge	P	campsite
		13	13UEM 279/243	Lac La Ronge	P	lithic scatter
	GhNe	1	13UEM 131/252	Lac La Ronge	H	Fur-trade post, NWC (?)
		2	13UEM 158/228	Lac La Ronge	H	cabin
		3	13UEM 158/227	Lac La Ronge	P	lithic scatter
		5	13UEM 169/305	Lac La Ronge	P	pictograph
	GhNf	1	13UEM 002/294	Lac La Ronge	P	lithic scatter
	GiNd	1	13UEM 264/441	Mountain Lake	P	pictograph
		2	13UEM 302/476	Mountain Lake	P	pictograph
		3	13UEM 303/476	Mountain Lake	P	pictograph

Table H-1 (cont.). Heritage resource site summary, La Ronge Greenstone Belt.

NTS. Sheet	Borden Unit	Site No.	U.T.M. Location	General Location	Period*	Site Type
		7	13UEM 297/326	Hale Lake	P	lithic scatter
		8	13UEM 296/325	Hale Lake	P	lithic scatter
		9	13UEM 297/321	Hale Lake	P	lithic scatter
		10	13UEM 294/319	Hale Lake	P	lithic scatter
		11	13UEM 284/412	Churchill River	H	Stanley Mission
	GiNe	1	13UEM 183/326	Lac La Ronge	P	lithic scatter
	GiNf	0	-	-	-	-
73 P/8	GhNa	0	-	-	-	-
	GhNb	0	-	-	-	-
	GhNc	0	-	-	-	-
	GiNa	1	13UEM 576/402	Keg Lake	P	pictograph
		2	13UEM 571/396	Keg Lake	P	campsite
		3	13UEM 610/411	Keg Lake	P	lithic scatter
		4	13UEM 598/416	Keg Lake	P	lithic scatter
		5	13UEM 578/394	Keg Lake	P	lithic scatter
		6	13UEM 602/392	Keg Lake	P	campsite
		7	13UEM 600/390	Keg Lake	P	campsite
		8	13UEM 594/396	Keg Lake	P	lithic scatter
		9	13UEM 632/382	Keg Lake	P	campsite
		10	13UEM 626/386	Keg Lake	P	lithic scatter
		11	13UEM 604/410	Keg Lake	P	campsite
		12	13UEM 612/409	Keg Lake	P	lithic scatter
		13	13UEM 612/407	Keg Lake	P	campsite
		14	13UEM 604/404	Keg Lake	P	campsite
		15	13UEM 603/400	Keg Lake	P	lithic scatter
		16	13UEM 594/403	Keg Lake	P	campsite
		17	13UEM 627/390	Keg Lake	P	campsite
		19	13UEM 594/415	Keg Lake	P	campsite
		27	13UEM 534/388	Drinking Lake	P	campsite
		28	13UEM 535/387	Drinking Lake	P	campsite
		29	13UEM 536/386	Drinking Lake	P	campsite
		30	13UEM 532/380	Drinking Lake	P	campsite
	GiNb	1	13UEM 457/403	Drinking Lake	P	campsite
		2	13UEM 473/393	Drinking Lake	P	campsite
		3	13UEM 486/415	Drinking Lake	P	lithic scatter
		4	13UEM 483/407	Drinking Lake	P	campsite
		5	13UEM 481/407	Drinking Lake	P	lithic scatter
		6	13UEM 486/407	Drinking Lake	P	lithic scatter
		7	13UEM 4995/409	Drinking Lake	P	campsite

Table H-1 (cont.). Heritage resource site summary, La Ronge Greenstone Belt.

NTS. Sheet	Borden Unit	Site No.	U.T.M. Location	General Location	Period*	Site Type
		8	13UEM 498/410	Drinking Lake	P	lithic scatter
		9	13UEM 498/414	Drinking Lake	P	lithic scatter
		10	13UEM 4995/410	Drinking Lake	P	lithic scatter
		11	13UEM 499/407	Drinking Lake	P	campsite
		12	13UEM 4975/412	Drinking Lake	P	lithic scatter
		13	13UEM 513/392	Drinking Lake	H,P	campsite
		14	13UEM 453/402	Nistowiak Lake	P	lithic scatter
		15	13UEM 494/393	Drinking Lake	P	lithic scatter
		16	13UEM 502/395	Drinking Lake	P	campsite
		17	13UEM 498/403	Drinking Lake	P	lithic scatter
		18	13UEM 470/400	Drinking Lake	H,P	campsite
		19	13UEM 517/393	Drinking Lake	H,P	campsite
		20	13UEM 500/394	Drinking Lake	P	campsite
		21	13UEM 498/404	Drinking Lake	P	lithic scatter
		22	13UEM 512/398	Drinking Lake	P	isolated find
		23	13UEM 514/391	Drinking Lake	P	campsite
		24	13UEM 471/395	Drinking Lake	D.I.	D.I.
		25	13UEM 502/393	Drinking Lake	H,P	cabins, campsite
		26	13UEM 468/398	Drinking Lake	P	lithic scatter
		30	13UEM 500/411	Drinking Lake	P	lithic scatter
		31	13UEM 502/412	Drinking Lake	P	campsite
		32	13UEM 502/413	Drinking Lake	H	campsite
		33	13UEM 503/415	Drinking Lake	H	cabin
		34	13UEM 508/418	Drinking Lake	P	campsite
		35	13UEM 520/391	Drinking Lake	P	campsite
		36	13UEM 505/397	Drinking Lake	P	campsite
		37	13UEM 515/385	Drinking Lake	H,P	campsite
		39	13UEM 527/367	Whitemoose River	P	isolated find
		40	13UEM 513/378	Drinking Lake	H	campsite
		41	13UEM 513/388	Drinking Lake	H,P	campsite
		42	13UEM 508/407	Drinking Lake	P	campsite
		43	13UEM 509/406	Drinking Lake	P	campsite
		44	13UEM 514/403	Drinking Lake	P	lithic scatter
		45	13UEM 505/404	Drinking Lake	D.I.	D.I.
		47	13UEM 503/403	Drinking Lake	P	isolated find
		48	13UEM 503/402	Drinking Lake	D.I.	D.I.
		49	13UEM 502/403	Drinking Lake	P	campsite
		50	13UEM 502/404	Drinking Lake	P	campsite
		51	13UEM 502/406	Drinking Lake	P	lithic scatter
		52	13UEM 503/407	Drinking Lake	P	lithic scatter

Table H-1 (cont.). Heritage resource site summary, La Ronge Greenstone Belt.

NTS. Sheet	Borden Unit	Site No.	U.T.M. Location	General Location	Period*	Site Type
		53	13UEM 510/409	Drinking Lake	P	lithic scatter
		54	13UEM 503/414	Drinking Lake	P	lithic scatter
		55	13UEM 508/333	Little Whitemoose Lake	H,P	campsite
		56	13UEM 520/338	Little Whitemoose Lake	H,P	campsite
		57	13UEM 519/333	Little Whitemoose Lake	P	campsite
	GiNc	1	13UEM 401/383	Iskwatikan Lake	P	campsite
		2	13UEM 403/401	Nistowiak Lake	H	Fur-trade post, HBC (?)
		3	13UEM 400/394	Nistowiak Lake	H	Fur-trade post, NWC, HBC (?)
		4	13UEM 324/424	Churchill River	P	pictograph
73 P/9	GjNa	0	-	-	-	-
	GjNb	0	-	-	-	-
	GjNc	0	-	-	-	-
	GkNa	0	-	-	-	-
	GkNb	0	-	-	-	-
	GkNc	0	-	-	-	-
73 P/10	GjNd	1	13UEM 297/545	Otter Lake	P	pictograph
		2	13UEM 286/654	Stewart Rattler Lake	P	pictograph
	GjNe	1	13UEM 168/663	Otter Lake	P	campsite
		2	13UEM 167/662	Otter Lake	P	lithic scatter
		3	13UEM 166/664	Otter Lake	P	lithic scatter
	GjNf	0	-	-	-	-
	GkNd	0	-	-	-	-
	GkNe	0	-	-	-	-
	GkNf	0	-	-	-	-
73 P/11	GjNg	0	-	-	-	-
	GjNh	0	-	-	-	-
	GjNi	0	-	-	-	-
	GkNg	0	-	-	-	-
	GkNh	0	-	-	-	-
	GkNi	0	-	-	-	-

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Table H-1 (cont.). Heritage resource site summary, La Ronge Greenstone Belt.

NTS. Sheet	Borden Unit	Site No.	U.T.M. Location	General Location	Period*	Site Type
73 P/12	GjNj	0	-	-	-	-
	GjNk	1	13UDM 566/655	Black Bear Island Lake	P	pictograph
		2	13UDM 559/659	Black Bear Island Lake	P	pictograph
		3	13UDM 521/684	Black Bear Island Lake	P	pictograph
		4	13UDM 517/511	Besnard Lake	P	pictograph
	GjNl	0	-	-	-	-
	GkNj	0	-	-	-	-
	GkNk	0	-	-	-	-
	GkNl	1	13UDM 468/741	Churchill River	P	pictograph
		2	13UDM 413/748	Kinosaskaw Lake	P	pictograph
73 P/13	GkNj	0	-	-	-	-
	GkNk	1	13UDM 482/812	Foster River	P	pictograph
	GkNl	0	-	-	-	-
	GlNj	0	-	-	-	-
	GlNk	1	13UDM 566/934	Eulas Lake	P	pictograph
	GlNl	0	-	-	-	-
73 P/14	GkNg	0	-	-	-	-
	GkNh	0	-	-	-	-
	GkNi	0	-	-	-	-
	GlNg	0	-	-	-	-
	GlNh	0	-	-	-	-
	GlNi	0	-	-	-	-
73 P/15	GkNd	0	-	-	-	-
	GkNe	0	-	-	-	-
	GkNf	0	-	-	-	-
	GlNd	1	13UEM 241/925	Lake Larocque	P	pictograph
		2	13UEM 238/922	Lake Larocque	P	pictograph
	GlNe	0	-	-	-	-
	GlNf	0	-	-	-	-
73 P/16	GkNa	0	-	-	-	-
	GkNb	0	-	-	-	-
	GkNc	0	-	-	-	-
	GlNa	1	13UEN 558/019	Calder Lake	P	pictograph
	GlNb	0	-	-	-	-

Table H-1 (cont.). Heritage resource site summary, La Ronge Greenstone Belt.

NTS. Sheet	Borden Unit	Site No.	U.T.M. Location	General Location	Period*	Site Type
	GlNc	0	-	-	-	-
74 A/1	HaNa	0	-	-	-	-
	HaNb	0	-	-	-	-
	HaNc	0	-	-	-	-
	HbNa	0	-	-	-	-
	HbNb	0	-	-	-	-
	HbNc	0	-	-	-	-
74 A/2	HaNd	0	-	-	-	-
	HaNe	0	-	-	-	-
	HaNf	0	-	-	-	-
	HbNd	0	-	-	-	-
	HbNe	0	-	-	-	-
	HbNf	0	-	-	-	-
74 A/3	HaNg	0	-	-	-	-
	HaNh	0	-	-	-	-
	HaNi	0	-	-	-	-
	HbNg	0	-	-	-	-
	HbNh	0	-	-	-	-
	HbNi	0	-	-	-	-
74 A/7	HbNd	0	-	-	-	-
	HbNe	0	-	-	-	-
	HbNf	0	-	-	-	-
	HcNd	0	-	-	-	-
	HcNe	0	-	-	-	-
	HcNf	0	-	-	-	-
74 A/8	HbNa	0	-	-	-	-
	HbNb	0	-	-	-	-
	HbNc	1	13VEN 336/362	Hickson Lake	P	pictograph
		2	13VEN 348/374	Hickson Lake	P	pictograph
		3	13VEN 328/351	Hickson Lake	P	pictograph
		4	13VEN 361/381	Hickson Lake	P	pictograph
		5	13VEN 328/346	Hickson Lake	P	pictograph
	HcNA	0	-	-	-	-
	HcNb	1	13VEN 433/515	stream south of Missi Lake	P	pictograph

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Table H-1 (cont.). Heritage resource site summary, La Ronge Greenstone Belt.

NTS. Sheet	Borden Unit	Site No.	U.T.M. Location	General Location	Period*	Site Type
	HcNc	1	13VEN 403/437	Hickson Lake	P	pictograph
		2	13VEN 329/600	Gow Lake	P	pictograph
74 A/9	HdNa	0	-	-	-	-
	HdNb	0	-	-	-	-
	HdNc	0	-	-	-	-
74 A/10	HdNd	0	-	-	-	-
	HdNe	0	-	-	-	-
	HdNf	0	-	-	-	-

*Period:
H = Historic
P = Prehistoric
H,P = combination, Historic and Prehistoric

+(?) : Data tentative

%D.I.: Data incomplete or absent

Table H-2. Heritage resource site distribution according to NTS sheet designation.

NTS Sheet	Number of Sites	NTS Sheet	Number of Sites
63 M/4	0	73 P/4	0
63 M/5	98	73 P/5	1
63 M/11	61	73 P/6	7
63 M/12	0	73 P/7	26
63 M/13	1	73 P/8	78
63 M/14	34	73 P/9	0
63 M/15	5	73 P/10	5
64 D/2	0	73 P/11	0
64 D/3	39	73 P/12	6
64 D/4	0	73 P/13	2
64 D/5	1	73 P/14	0
64 D/6	17	73 P/15	2
64 D/7	0	73 P/16	1
64 D/10	0	74 A/1	0
64 D/11	0	74 A/2	0
64 D/12	0	74 A/3	0
73 I/13	0	74 A/7	0
73 I/14	1	74 A/8	8
73 I/15	1	74 A/9	0
73 I/16	0	74 A/10	0
73 P/1	0		
73 P/2	3		
73 P/3	18		

TOTAL 415

Table H-3. Heritage resource site distribution according to Borden Unit designation.

Borden Unit	Number of Sites	Borden Unit	Number of Sites	Borden Unit	Number of Sites	Borden Unit	Number of Sites
GgMv	0	GgNc	0	GjNj	0	HcMt	6
GgMw	0	GgNd	0	GjNk	4	HcMu	2
GgMx	0	GgNe	0	GjNl	0	HcMv	1
GhMv	0	GgNf	0	GkNa	0	HcMw	0
GhMw	4	GgNg	1	GkNb	0	HcMx	0
GhMx	0	GgNh	13	GkNc	0	HdMr	0
GiMv	33	GgNi	1	GkNd	0	HdMs	0
GiMw	33	GgNj	0	GkNe	0	HdMt	0
GiMx	28	GgNk	0	GkNf	0	HdMu	0
GjMs	23	GgNl	0	GkNg	0	HdMv	0
GjMt	32	GhNa	0	GkNh	0	HdMw	0
GjMu	0	GhNb	0	GkNi	0	HdMx	0
GjMv	0	GhNc	0	GkNj	0	HaNa	0
GjMw	0	GhNd	13	GkNk	1	HaNb	0
GjMx	0	GhNe	6	GkNl	2	HaNc	0
GkMr	0	GhNf	1	GlNa	1	HaNd	0
GkMs	17	GhNg	6	GlNb	0	HaNe	0
GkMt	3	GhNh	4	GlNc	0	HaNf	0
GkMu	1	GhNi	0	GlNd	2	HaNg	
GkMv	0	GhNj	0	GlNe	0	HaNh	0
GkMw	0	GhNk	0	GlNf	0	HaNi	0
GkMx	0	GhNl	0	GlNg	0	HbNa	0
GlMr	5	GiNa	22	GlNh	0	HbNb	0
GlMs	17	GiNb	52	GlNi	0	HbNc	5
GlMt	2	GiNc	4	GlNj	0	HbNd	0
GlMu	0	GiNd	8	GlNk	1	HbNe	0
GlMv	0	GiNe	1	GlNl	0	HbNf	0
GlMw	1	GiNf	0	HaMr	0	HbNg	0
GlMx	0	GiNg	0	HaMs	17	HbNh	0
GfNa	0	GiNh	0	HaMt	4	HbNi	0
GfNb	0	GiNi	0	HaMu	0	HcNa	0
GfNc	0	GiNj	0	HaMv	0	HcNb	1
GfNd	0	GiNk	0	HaMw	0	HcNc	2
GfNe	1	GiNl	1	HaMx	0	HcNd	0
GfNf	0	GjNa	0	HbMr	0	HcNe	0
GfNg	0	GjNb	0	HbMs	17	HcNf	0
GfNh	1	GjNc	0	HbMt	8	HdNa	0
GfNi	0	GjNd	2	HbMu	1	HdNb	0
GfNj	0	GjNe	3	HbMv	0	HdNc	0
GfNk	0	GjNf	0	HbMw	0	HdNd	0
GfNl	0	GjNg	0	HbMx	0	HdNe	0
GgNa	0	GjNh	0	HcMr	0	HdNf	0
GgNb	0	GjNi	0	HcMs	1		
						TOTAL	415

Table H-4. Heritage resource site distribution according to waterbody.

General Location	Number of Sites	General Location	Number of Sites
Besnard Lake	2	Little Whitemouse Lake	3
Bigstone Lake	1	Marchand Lake	5
Black Bear Island Lake	3	Montreal River	1
Calder Lake	1	Mountain Lake	3
Churchill River	69	Nemeiben Lake	1
Carruthers Lake	1	Nemeiben River	3
Drinking Lake	51	Nistoassinni Lake	1
East of Gloeckler Lake	1	Nistowiak Lake	3
Eulas Lake	1	Otter Lake	4
Fafard Lake	9	Ourom Lake	21
Foster River	1	Potatoe River	3
Gow Lake	1	Reindeer Lake	7
Hale Lake	4	Reindeer River	54
Harriott River	1	Royal Lake	3
Henry Lake	2	Sadler Lake	4
Hickson Lake	6	Steephill Lake	19
Iskwatikan Lake	1	Stewart Rattler River	1
Keg Lake	36	stream south of Missi Lake	1
Kelly Lake	1	Trade Lake	33
Kinosaskaw Lake	1	Uskik Lake	8
Lac La Ronge	39	Whitemouse River	1
Lake Larocque	2		
Little Deer River	2		
		TOTAL	415

Table H-5. Heritage resource site period summary.

Site Period	Number	% of Total
Historic	83	20.0
Prehistoric	277	66.7
combination Historic/Prehistoric	40	9.6
Data Incomplete	15	3.6
TOTAL	415	100.0

Table H-6. Heritage resource site type summary.

Site Type	Number	Percentage of Total
Cabin	15	3.6
Cairn	1	0.2
Campsite	209	50.5
Fur-trade post	13	3.1
Isolated find	17	4.1
Lithic scatter	100	24.2
Mission church	1	0.2
Petroglyph	1	0.2
Pictograph	30	7.3
Portage trail	1	0.2
Quarry	1	0.2
Stone circle	1	0.2
Unspecified structural remains	2	0.5
Workshop	1	0.2
Cabin/campsite	2	0.5
Campsite/boulder circle	1	0.2
Fur-trade post/campsite	2	0.5
Isolated find/lithic scatter	1	0.2
Structural remains/campsite	1	0.2
Data Incomplete	15	3.7
TOTAL	415	100.0

Table H-7. Heritage resource data sources for the La Ronge Greenstone Belt.

Saskatchewan Culture and Recreation, Regina

Archaeological site files and 1:50,000 N.T.S. sheets
Environmental impact studies, including sections dealing with heritage resources
General archaeological reports and manuscripts; selected titles predating 1980, complete from 1980 to present
Heritage Resource Impact Assessment reports; selected titles predating 1980, complete from 1980 to present
Historic site files, including C.I.H.B.
Historic site inventory, fur-trade establishments
Parks Canada reports, selected titles
Saskatchewan Archaeological Society periodicals

Saskatchewan Museum of Natural History, Regina

Churchill River study; proposals, overviews, impact assessments and field reports
General historical publications, selected titles
General rock-art reports and publications
Pre-1980 field reports, personal diaries and unpublished manuscripts
Saskatchewan Archaeological Society periodicals

Saskatchewan Research Council, Saskatoon

Archaeological impact assessment reports
Archaeological research reports and field notes
Churchill River study impact assessments and field reports
General archaeological and historical publications, selected titles

University of Saskatchewan, Department of Anthropology and Archaeology

M. A. theses
Rock-art reports, drawings and photographs
Unpublished research reports
Unpublished student papers

University of Regina and Saskatchewan Libraries, Regina and Saskatoon

Archives, Morton collection (Saskatoon)
Geological Survey of Canada periodicals (Saskatoon)
General publications, historical and fur-trade sites (Regina and Saskatoon)
M.A. theses (Saskatoon)

Table H-8. Heritage resource reference topic summary - La Ronge Greenstone Belt.

General Archaeological Summary
- Meyer 1983c

General Historical Summaries
- Davies 1975
- La Ronge Heritage Committee 1981

Fur-trade Period Summaries
- Henry the Younger 1965
- Morse 1969
- Morton 1973
- Rich 1960
  1967
- Smythe 1968
- Thompson 1962
  1968
- Tyrrell 1934

Site Records
- Government of Saskatchewan 1986a,b & c

Archaeological and Historical Research and Heritage Impact Assessments
- Brace and Dyck 1978
- Brown 1960
- Downes 1938
- Fedge 1976
- Harper 1985
- Light 1980
- Meyer 1978a
  1978b
  1983a
  1983b
- Moody n.d.
  1954
  1956
  1958
- Smailes 1979
- Smith 1986
- Spurling 1980
- Turner 1958
- Tyrrell 1896
- University of Saskatchewan 1986
- Wilson and Light 1980

Table H-8 (cont.). Heritage resource reference topic summary - La Ronge Greenstone Belt.

Rock Art Studies

- Dewdney 1962
  - 1963a
  - 1963b
- Dewdney and Kidd 1962
- Jones 1974
  - 1981
- Pohorecky 1981

Churchill River Hydro-electric Project and Impact Studies, Archaeological and Historic Sites

- Churchill River Study Board 1975
- Epp 1973
- Epp and Meyer 1973
- F. F. Slaney and Company 1973
- Meyer 1974
  - 1975
- Meyer and Smailes 1974
  - 1975
- Saskatchewan Museum of Natural History 1972
- Schmidt, Meyer and Sawchyn 1978
- Stewart and Foraie 1974

Stanley Mission

- Korvemaker 1982 (including complete bibliography)
- Murray 1981a
  - 1981b
  - 1981c
- Rostecki and Wright 1976

MAPS
NOT
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CARTES
OMISES